Primary 4

Math Term 1



Primary 4
Student Edition

Math Term 1

About 2,299,960 blocks of stone

Stones have average mass of about 2,300 kg



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Primary 4 Math

Name ____________________



Primary 4

About 2,299,960
blocks of stone

Stones have average
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Math Term 1

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FOREWORD

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2 and Primary 1. In 2021 we have rolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Center for Curriculum and Instructional Materials Development" (CCIMD) and specifically, the CCIMD Director and her amazing team. MOETE is also very grateful to the minister's senior advisors and to our partners including "Discovery Education," "National Geographic Learning" "Nahdet Masr," "Longman Egypt," UNICEF, UNESCO, and WB, who, collectively, supported the development of Egypt's national curriculum framework. I also thank the Egyptian Faculty of Education professors who participated in reviewing the national curriculum framework. Finally, I thank each and every MOETE administrator in all MOETE sectors as well as the MOETE subject counselors who participated in the process.

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president, His Excellency President Abdel Fattah el-Sisi. Overhauling the education system is part of the president's vision of "rebuilding the Egyptian citizen" and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports. Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.

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WORDS FROM THE MINISTER OF EDUCATION & TECHNICAL EDUCATION

It is my great pleasure to celebrate this extraordinary moment in the history of Egypt where we continue to launch a new education system designed to prepare a new Egyptian citizen proud of his Egyptian, Arab and African roots — a new citizen who is innovative, a critical thinker, able to understand and accept differences, competent in knowledge and life skills, able to learn for life and able to compete globally.

Egypt chose to invest in its new generations through building a transformative and modern education system consistent with international quality benchmarks. The new education system is designed to help our children and grandchildren enjoy a better future and to propel Egypt to the ranks of advanced countries in the near future.

The fulfillment of the Egyptian dream of transformation is indeed a joint responsibility among all of us; governmental institutions, parents, civil society, private sector and media. Here, I would like to acknowledge the critical role of our beloved teachers who are the role models for our children and who are the cornerstone of the intended transformation.

I ask everyone of us to join hands towards this noble goal of transforming Egypt through education in order to restore Egyptian excellence, leadership and great civilization.

My warmest regards to our children who will begin this journey and my deepest respect and gratitude to our great teachers.

Dr. Tarek Galal Shawki

Minister of Education & Technical Education

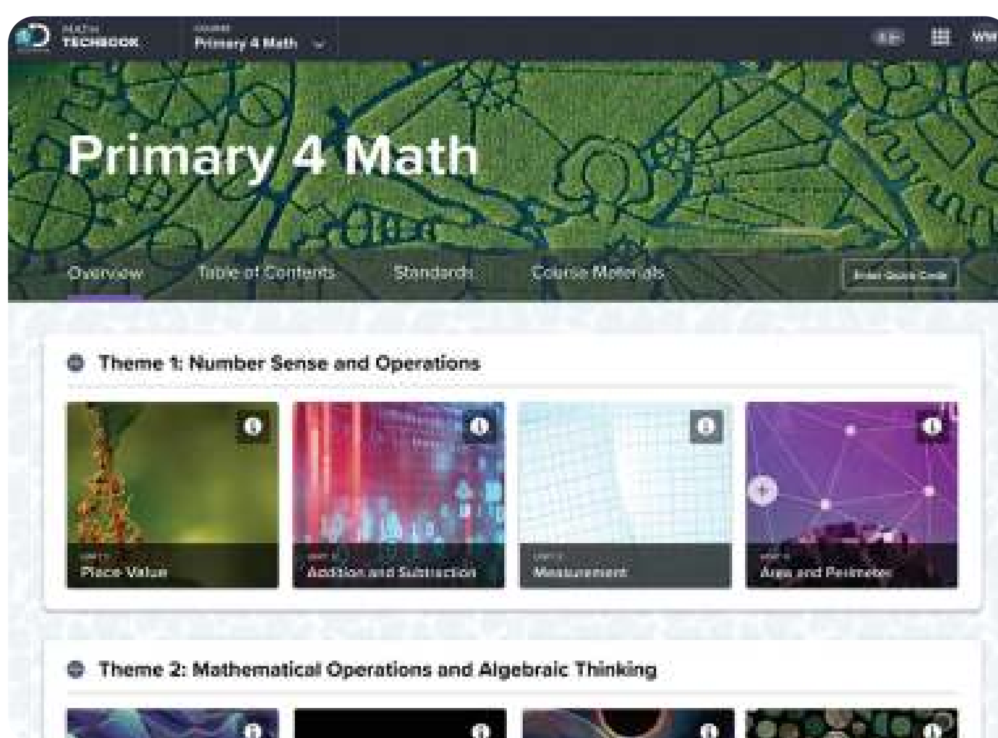


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Dear Parent/Guardian,

Welcome to Primary 4 Mathematics Techbook™! This comprehensive program inspires students to make sense of the world around them and to think and act like mathematicians. Throughout the digital and print program, students learn to reason mathematically, communicate using mathematical language, ask meaningful questions, solve complex problems, and work collaboratively with peers.



Primary 4 Mathematics Techbook was designed and written to teach to the Ministry of Education Primary 4 mathematics standards. The structure of Primary 4 Mathematics Techbook represents the Ministry's shifts in the Framework for Education 2.0, specifically focusing on accessing new and prior knowledge, building contextual understanding and procedural fluency, and making connections across mathematics to support application of skills and concepts. To help students make sense of mathematical content, the program also integrates a thematic approach and a variety of real-world scenarios.

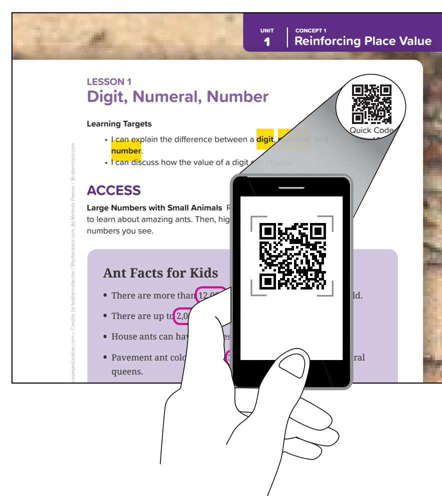
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Primary 4 Mathematics Techbook challenges students to build on what they learned in previous grades, applying concepts and skills in new ways. Students also learn new and complex concepts and skills that prepare them for the challenges of Primary 5 and beyond. Primary 4 students assume greater responsibility for their own learning and are encouraged to seek opportunities to apply the mathematics they are learning in the world around them.

The major work of Primary 4 includes multiplication, division, fractions, decimals, and plane figures such as lines, line segments, rays, and angles. Although these may seem like separate topics, students investigate and apply patterns and relationships among the topics to build a deeper understanding of each. They solve fraction multiplication problems, connect angle measurement to fractions, explore the inverse relationship between multiplication and division, and draw parallels among decimal numbers, fractions, and place value. Students learn to think like mathematicians as they notice patterns and rules, persevere to solve challenging problems, represent and explain their thinking, model their solutions, and strive for accuracy.

To inspire and motivate learning and curiosity, Primary 4 Mathematics Techbook features clear and engaging text, videos, digital tools, and Hands-On Activities. Hands-On Activities require students to investigate patterns and rules in mathematics and challenge them to communicate using mathematical language and models. The program also engages students in many kinds of writing and asks them to explain their reasoning and support their thinking using words, numbers, pictures, and symbols. When students engage in rich tasks that access prior knowledge and build reasoning, it is easier for them to make connections to the real world and to other mathematical learning.



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Dear Parent/Guardian, *continued*

Primary 4 Mathematics Techbook is divided into units. Each unit is divided into concepts, and each concept is divided into lessons. Each lesson has three main sections: ACCESS, BUILD, and CONNECT.

ACCESS Students activate their prior knowledge and begin to develop and express mathematical language.

BUILD Students focus on communicating their understanding, reasoning, evidence, and mathematical strategies.

CONNECT Students build deep conceptual understanding and a strong foundation for accessing knowledge in future lessons.

In addition, **WRAP-UP**, **PRACTICE**, and **CHECK YOUR UNDERSTANDING** features allow students to demonstrate their learning either verbally or in writing.

Within this Student Edition, you will find QR codes and quick codes that take you and your student to a corresponding section of Primary 4 Mathematics Techbook online.

We encourage you to support your student in using the print and online interactive materials on any device. Together, may you and your student enjoy a fantastic year of mathematics.

Sincerely,

The Discovery Education Math Team

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UNIT
1

Theme 1 | Number Sense and Operations

Unit 1
Place Value

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Mighty Ant Facts

Unit Video Questions



Quick Code
egm4008

In this unit, you will meet Omar and Mariam, two students who are amateur myrmecologists. A myrmecologist is someone who studies ants. As part of their ant study project, they find ant colonies, study ant behaviors, and count ants to track populations and the health and variety of local ant colonies. This research requires them to count, read, write, and compare very big numbers.

- ☐ How can you use what you already know about place value to learn about numbers to the Milliards place?
- ☐ What strategies can you use to read and write really big numbers?
- ☐ How can you use place value to compare and order really big numbers?

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CONCEPT
1



Reinforcing Place Value

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LESSON 1

Review Digit, Numeral, Number


Quick Code egm4001

Learning Targets

- I can explain the difference between a **digit**, **numeral**, and **number**.
- I can discuss how the value of a digit can change.

ACCESS

Large Numbers with Small Animals Read Ant Facts for Kids to learn about amazing ants. Then, highlight or circle all of the numbers you see.

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Ant Facts for Kids

- There are more than 12,000 species of ants all over the world.
- There are up to 2,000 ants in a colony of carpenter ants.
- House ants can have colonies of up to 10,000.
- Pavement ant colonies have 3,000–4,000 members and several queens.
- An ant can lift 20 times its own body weight. If you were as strong as an ant, you would be able to pick up a cow.
- Egypt has 79 different species of ants.
- The total number of ants on the planet is estimated at 1,000,000,000,000,000 (one million milliard).



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BUILD

Numeral Building Write any large numeral you can think of, here or on a piece of paper.

Vocabulary Building In your own words, write a brief definition of the terms digit, number, and numeral. It is okay if you do not yet know the difference among the three.

Digit ______________________________

Number ______________________________

Numeral ______________________________

Record the definitions that were written by the class.

Digit ______________________________

Number ______________________________

Numeral ______________________________



Ants Near an Anthill

Photo Credit: (a) feathercollector / Shutterstock.com, (b) AG-PHOTOS / Shutterstock.com

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CONNECT

Writing About Math Consider the numbers 26, 260, and 62. Explain what strategies you would use to determine the greatest number. Try to use the words *digit*, *numeral*, and *number* to explain your thinking. Be prepared to share your thinking with the class.

PRACTICE

1. Write each number in the appropriate column. Some may go in more than one column.

983	**thirty-seven**	**six**	**0**
9	**seventy-five**	**2,300,540**	**one hundred**

Digit	Number	Numeral

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2. Sara says that in the number 458 there are 3 digits. Do you agree or disagree? Explain.

3. Write a numeral that has 5 different digits.



Check Your Understanding

Follow your teacher's instructions to complete this activity.



Carpenter Ants Building Nests in Wood

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LESSON 2
Really Big Numbers!


Quick Code
egm4002

Learning Targets

- I can identify all whole number **place values** through the One **Milliard** place.
- I can explain how a digit's location in a number affects its value.

ACCESS

Exploring Place Value Talk with your Shoulder Partner. Record what you remember about the place value system from earlier grades. Be prepared to share your thinking with the class.

Photo Credit: feathercollector / Shutterstock.com

BUILD

Reading the Place Value Chart Use the place value chart to help you read the number aloud with your teacher. Write numbers in the place value chart with your teacher. The first one is done for you.

	period			period			period		
Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O
		3	5	8	9	1	4	5	5

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Creating Really Big Numbers

Practice creating, reading, and comparing really big numbers.

1. Place all digit cards face down in the middle and mix them up.
2. One person in the group turns over a digit card. Each player independently decides which place value to put the digit in and records the digit in their own place value chart.
3. The next student turns over a card. Each player independently decides which place value to put the digit in and records the digit in their own place value chart.
4. Repeat until all spaces in the row have been filled. Then, players compare their numerals. The player with the greatest numeral wins a point. There is room to play 5 rounds.

	period			period			period		
Milliards	**Millions**			**Thousands**			**Ones**		
O	**H**	**T**	**O**	**H**	**T**	**O**	**H**	**T**	**O**

Track your points.

Photo Credit: feathercollector / Shutterstock.com

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CONNECT

Writing About Math Amir says that in the number 222, all of the digits have the same value. Do you agree or disagree? Use words and numbers to explain your thinking.

PRACTICE

Follow your teacher's directions to solve the practice problems.

1. In the numeral 234,568 what digit is in the
   - Tens place? ______
   - Hundred Thousands place? ______
   - One Thousands place? ______

2. Using the following number, complete the directions:

   1,542,345,678

   - Underline the digit in the Ten Millions place.
   - Draw a square around the digit in the One Milliards place.
   - Circle the digit in the Hundreds place.

3. Is the digit 8 always worth 8 (▲▲▲▲▲▲▲▲)? Why or why not? Use what you know about place value to support your answer.

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3
Changing Values


Quick Code
egm4003

Learning Targets

- I can explain how the value of a digit changes as it moves to the left in a number.
- I can describe the patterns I see as a digit changes value.

ACCESS

Multiplying by Ten Use your Tens rods to explore patterns in multiplying by 10.

1. What quantity is represented by your Tens rods? Draw a picture, write an equation, or write a number to show the quantity.

2. What quantity is represented by your group's Tens rods? Draw a picture, write an equation, or write a number to show the quantity.

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BUILD

What Is My Value? Follow the steps to explore how a digit's value changes when its location changes.

- Choose one digit and enter it in the Ones place.
- Record the value of the digit.
- Continue moving the digit card to the left on the place value chart, recording its new value each time.

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

Photo Credit: feathercollector / Shutterstock.com

My digit is ______________

Value of my digit in the Ones place ______________

Value of my digit in the Tens place ______________

Value of my digit in the Hundreds place ______________

Value of my digit in the Thousands place ______________

Value of my digit in the Ten Thousands place ______________

Value of my digit in the Hundred Thousands place ______________

Value of my digit in the Millions place ______________

Value of my digit in the Ten Millions place ______________

Value of my digit in the Hundred Millions place ______________

Value of my digit in the One Milliards place ______________

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Exploring Place Value Relationships Work with your teacher to explore place value relationships. Then, circle the value that completes the sentence.

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

As a digit moves one space to the left on the place value chart, its value increases by **[1/10/100/1,000]** times.

CONNECT

Omar and Mariam are **myrmecologists** (scientists who specialize in studying ants). They found a colony with 10 anthills. Remarkably, each anthill had the same number of ants.

Multiplying Ants Look at each problem in the table. If Omar and Mariam found the given number of ants in each anthill, how many ants were there all together? Show your work for each problem.

7 ants in 1 anthill. _______ ants in 10 anthills.	92 ants in 1 anthill. _______ ants in 10 anthills.
12 ants in 1 anthill. _______ ants in 10 anthills.	156 ants in 1 anthill. _______ ants in 10 anthills.
28 ants in 1 anthill. _______ ants in 10 anthills.	1,786 ants in 1 anthill. _______ ants in 10 anthills.

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PRACTICE

Follow your teacher's directions to solve the practice problems.

1. What is the value of each of the following:

   a. 2 in the Tens place? ____________

   b. 7 in the Hundreds place? ____________

   c. 30 Tens? ____________

   d. 60 Thousands? ____________

2. How does the value of a 7 change as it moves from the Tens place to the Hundreds place? Use what you know about place value to explain your thinking.

Photo Credit: feathercollector / Shutterstock.com

3. Choose a number between 1 and 9. (A different number than you used in BUILD.) Use this number to complete the charts.

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

My digit is ____________

Value of my digit in the Ones place ____________

Value of my digit in the Tens place ____________

Value of my digit in the Hundreds place ____________

Value of my digit in the Thousands place ____________

Value of my digit in the Ten Thousands place ____________

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Value of my digit in the Hundred Thousands place ____________________

Value of my digit in the Millions place ____________________

Value of my digit in the Ten Millions place ____________________

Value of my digit in the Hundred Millions place ____________________

Value of my digit in the One Milliards place ____________________

4. What pattern (or patterns) do you observe in your answers to Question 3?



Check Your Understanding

Follow your teacher's instructions to complete this activity.



Ant Colony Containing Millions of Ants

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LESSON 4

Review Comparing Values

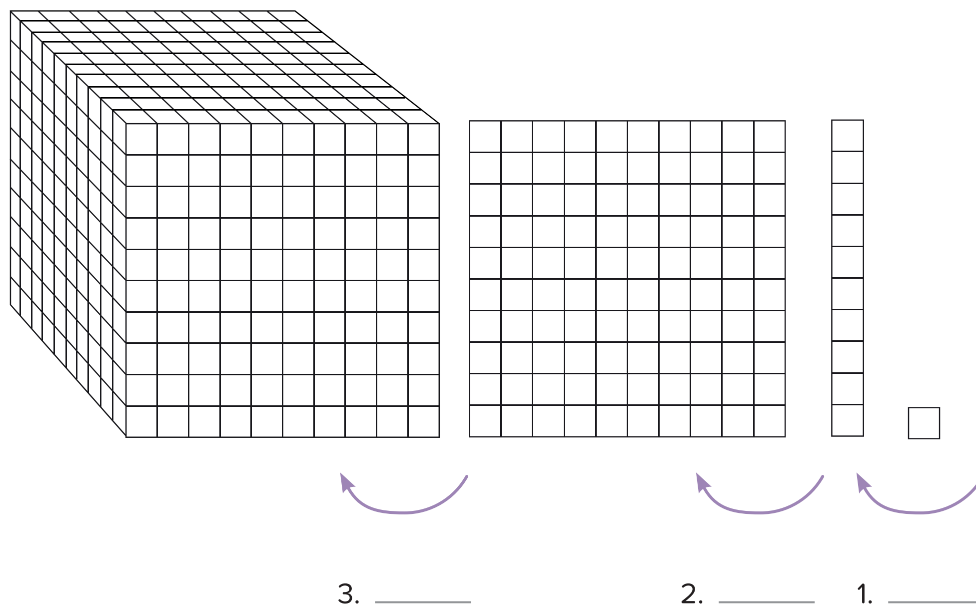

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Learning Targets

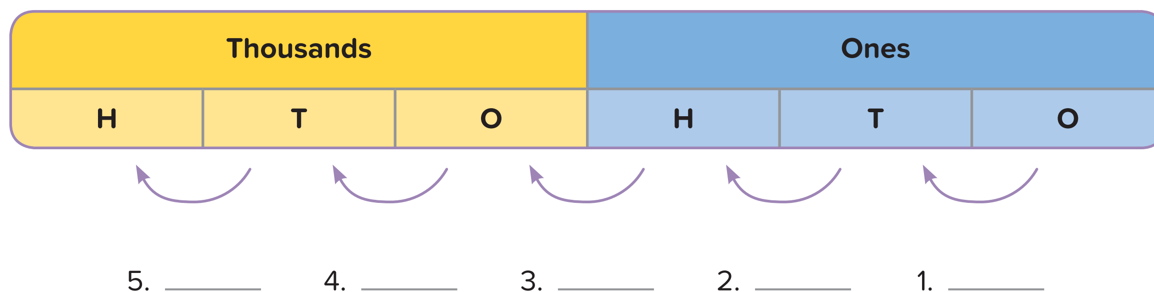
- I can explain the relationship between place values.
- I can use multiplication to **compare** place values.

ACCESS

Relationships Are Important! Think about the relationships among the Base Ten blocks. Use multiplication to describe the relationship between the value of a digit at the start of the arrow and the value of that same digit at the end of the arrow. Start at 1.



Use multiplication to describe the relationship between the given place value and the place value one step to its left. Start at 1.



Thousands			Ones		
H	T	O	H	T	O

5. ______ 4. ______ 3. ______ 2. ______ 1. ______

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BUILD

Exploring Place Value Relationships Are you ready for challenging questions? How many Hundreds are in 1,000? Think quietly for a moment. Then, record your thinking and share your notes with a partner. Be prepared to share your ideas with the whole group.

How many Tens are in 1,000? Think quietly for a moment. Then, record your thinking and share your notes with a partner. Next, work with your small group. Use your Tens rods to help you determine or confirm how many Tens are in 1,000. Be prepared to share your ideas with the whole group.

Hundreds in 1,000	Tens in 1,000

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Reflect on this learning activity. What do you now notice? What do you now wonder? Be prepared to share your ideas with the whole group.

Place Value and the Pharaoh Ant Work with a partner. Use what you know about place value relationships and the Pharaoh Ant to answer the questions. Be prepared to share your thinking with the class.

Pharaoh Ant queens lay around 400 eggs throughout their lifetime in batches of about 10. How many eggs will be laid in a year...

1. If there are 10 queens in a colony? ____________________
2. If there are 100 queens in a colony? ____________________
3. If there are 1,000 queens in a colony? ____________________

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Work in pairs or small groups to solve problems about place value relationships.

Pharaoh Ant Colonies New Pharaoh Ant colonies form through a process called budding. Queens in existing colonies and several workers leave their nest to start new colonies elsewhere.

So, a colony that starts with 200 ants can quickly

grow ________ times greater to a size of 20,000 ants.

A Pharaoh Ant colony can vary in size from a few dozen to several hundred thousand individuals. Imagine a Pharaoh Ant colony consisting of 333,333 ants!

4. In which place is the 3 that has a value 10 times greater than the 3 in the Ten Thousands place? ________________

5. In which place is the 3 that has a value 100 times greater than the 3 in the Ones place? ________________

6. How many times greater is the value of a number in the One Thousands place than a number in the Tens place? Use an example to support your thinking.

7. If there are 12 million Pharaoh Ants on the Kalahari and South America has 100 times as many Pharaoh Ants as the Kalahari, how many ants are in South America? Show your work.

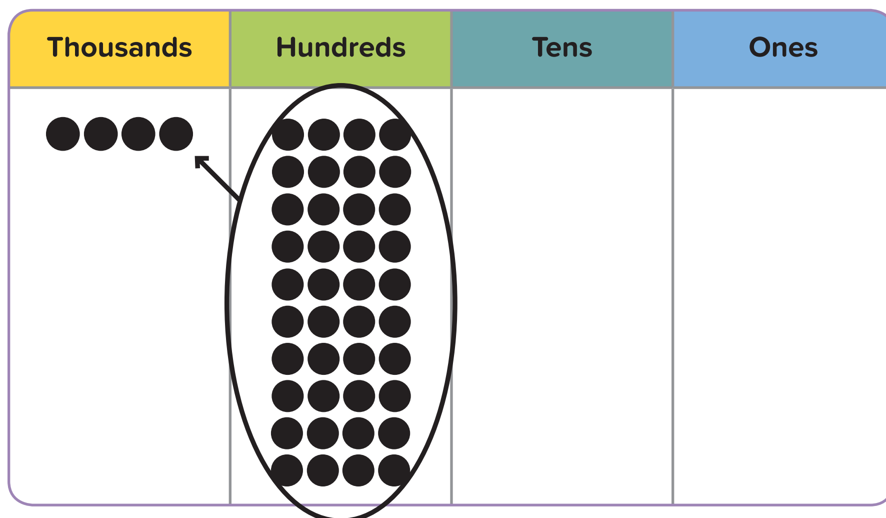
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Reinforcing Place Value

CONNECT

Step to the Left Write a statement about the dots in the place value chart using the words "10 times greater."



PRACTICE

1. (4 Tens and 3 Ones) x 10 = ________________
2. (2 Hundreds and 3 Tens) × 10 = ________________
3. (7 Thousands and 8 Hundreds) × 100 = ________________
4. (6 Hundred and 4 Tens) x 1,000 = ________________
5. (4 Ten Thousands and 3 Tens) x 100 = ________________
6. Highlight or circle the number that is 100 times greater than 560.

   5,600 56,000



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 5

Many Ways to Write



Quick Code
egm4005

Learning Target

- I can write numerals in standard, word, and expanded forms.

ACCESS

Same or Different? Omar and Mariam are amateur myrmecologists, scientists who study ants. They are conducting research to find out if ant populations are declining. Part of their research involves counting the number of ants that live in one anthill. Every day they count ants.

At the end of the month, Omar recorded the number of ants he had counted as follows:

1,467,303,221

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Scientist Collecting and Recording Data

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Mariam recorded her count in this way:

1,000,000,000 + 400,000,000 + 60,000,000 + 7,000,000
+ 300,000 + 3,000 + 200 + 20 + 1

BUILD

Numeral Form Exploration Compare the different forms of the same numeral. Use the information as a guide and reference.

Standard Form	9,231,043,204
Expanded Form	9,000,000,000 + 200,000,000 + 30,000,000 + 1,000,000 + 40,000 + 3,000 + 200 + 4
Word Form	nine milliard, two-hundred thirty-one million, forty-three thousand, two hundred four

Be prepared to share your thinking about these questions:

- What do you remember about these forms of writing numerals?
- What was easy?
- What was challenging?

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Creating the Greatest

Play Creating the Greatest with a partner to practice creating numbers and writing them in multiple forms.

- Combine decks of digit cards with your partner. Place the cards face down in a pile and mix them up.
- Turn over 10 digit cards and record the numbers in the order in which you turned them over.
- Rearrange the 10 cards to create the greatest numeral.
- Record the numeral in standard form, word form, and expanded form.

1. ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

   Standard Form ______________________

   Expanded Form ______________________

   Word Form ______________________

2. ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

   Standard Form ______________________

   Expanded Form ______________________

   Word Form ______________________

3. ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

   Standard Form ______________________

   Expanded Form ______________________

   Word Form ______________________

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Creating the Greatest

4. ____ ____ ____ ____ ____ ____ ____ ____ ____ ____

Standard Form ____________________

Expanded Form ____________________

Word Form ____________________

5. ____ ____ ____ ____ ____ ____ ____ ____ ____ ____

Standard Form ____________________

Expanded Form ____________________

Word Form ____________________

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CONNECT

Writing About Math Highlight or circle the greatest numeral you created. How do you know that the numeral you chose was the greatest number of all of the numerals you created? Explain the strategy you used to make your determination. Be prepared to share your thinking with the class.

PRACTICE

1. Write the word form of 48.

____

2. Write the standard form of three hundred seventy.

____

3. Write the standard form of 20,000 + 7,000 + 400 + 20 + 2.

____

4. Write the word form of 700,000 + 60,000 + 20 + 9.

____

5. Write the expanded form of 50,391.

____



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 6
Composing and Decomposing


Quick Code
egm4006

Learning Target

- I can build and break down numerals in multiple forms.

ACCESS

We Have/Who Has? Sit with your small group. Then, play the game We Have/Who Has to practice reading large numbers in multiple forms.

Directions

1. One group starts by reading their card aloud together.
2. The group who has the "Who Has?" number raises their hands and then reads their card aloud.
3. Play until every group has used its card.

BUILD

Terminology Review Complete the activity to check your current understanding of the terms standard, word, and expanded form. For each term, write a definition and give an example.

Vocabulary	Definition	Example
Standard Form		
Word Form		
Expanded Form		

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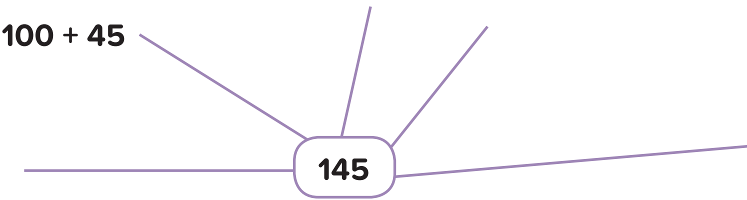
Composing and Decomposing Do you remember the terms composing and decomposing from Primary 3? Look at the two images. What do you think the terms mean?


Ants **Composing** a New Anthill


Wind and Rain **Decomposing** This Anthill

Photo Credit: (a) feathercollector / Shutterstock.com, (b) Andrey_Rut / Shutterstock.com, (c) VERA FISIUK / Shutterstock.com

Composing 145 What are some different ways we can compose 145? Use the web to record your ideas. One idea is given to get you started.



Composed and Decomposed Numbers Several composed and decomposed numbers follow. Fill in the missing numbers. Use the place value chart to help you. The first one has been done for you as an example.

Composed 345,532

Decomposed (3 x 100,000) + (4 x 10,000) + (5 x 1,000) + (5 x 100) + (3 x 10) + (2 x 1)

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O
				3	4	5	5	3	2

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1. **Composed** 6,124,030,420

Decomposed ______________________

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

2. **Composed** ______________________

Decomposed ______________________

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O
5	4	0	0	1	5	9	0	2	4

3. **Composed** ______________________

Decomposed (7 x 1,000,000,000) + (5 x 10,000,000) + (4 x 10,000) + (3 x 1,000) + (5 x 100) + (9 x 1)

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

Photo Credit: feathercollector / Shutterstock.com

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For the next problem, choose your own number and show it composed and decomposed.

4. **Composed** ______________________

Decomposed ______________________________________

____

____

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

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CONNECT

Writing About Math Reflect on today's Learning Target and your learning progress. Respond to the questions.

Learning Target

- I can **compose** and **decompose** numbers in multiple forms.

What do I understand well?

What is still confusing to me?

Who can I ask for help?

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PRACTICE

Solve the problems. Show your work.

1. Colony A has 268,820 Pharaoh Ants living in it. Decompose this numeral as you did in BUILD.

2. Yara's class learned that the distance from the Earth to the Moon can be written as 300,000 + 80,000 + 4,000 + 400 kilometers. Compose this numeral.

Photo Credit: feathercollector / Shutterstock.com

Decompose the numerals that follow using expanded form.

3. 105,208

____

4. 2 million, 277 thousand, 191

____

5. three milliard, one hundred thirty-seven million, six hundred nineteen thousand, eighty-eight

____



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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CONCEPT
2

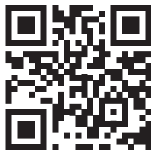
Using Place Value

Photo Credit: Rajath Raghav / Shutterstock.com

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LESSON 7

Review Comparing Really Big Numbers



Quick Code
egm4010

Learning Target

- I can use symbols and place value to compare large numerals.

ACCESS

Error Analysis Analyze the student's work and their answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Record the following numeral in standard form:

(6 x 100,000) + (5 x 10,000) + (4 x 1,000) + (3 x 100).

Student's answer: 6,543

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

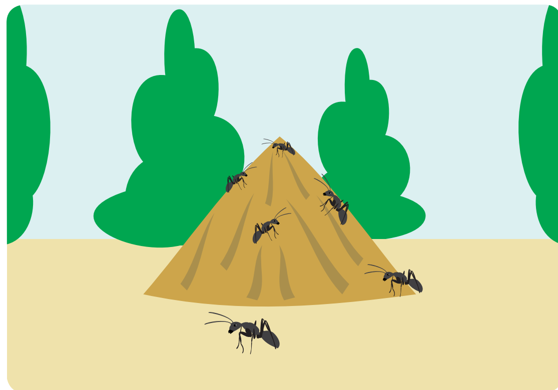
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BUILD

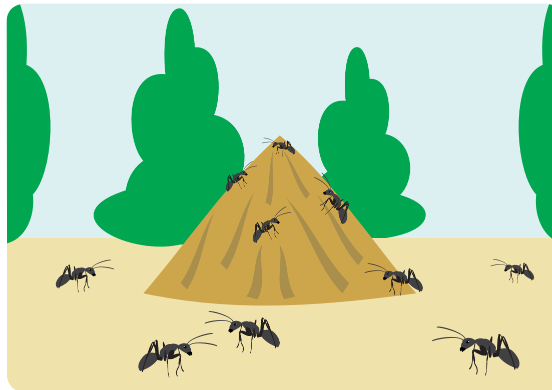
Comparing Anthills Highlight or circle the digits that are the same in both numbers.

Anthill 1



4,356

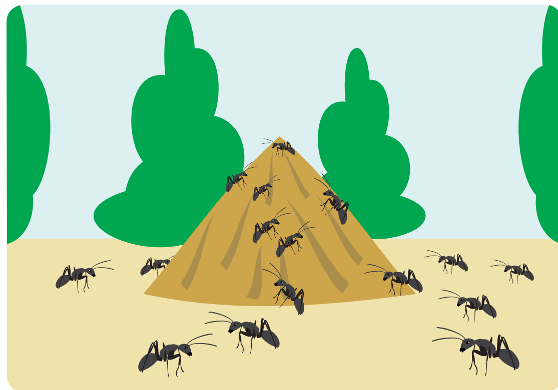
Anthill 2



4,502

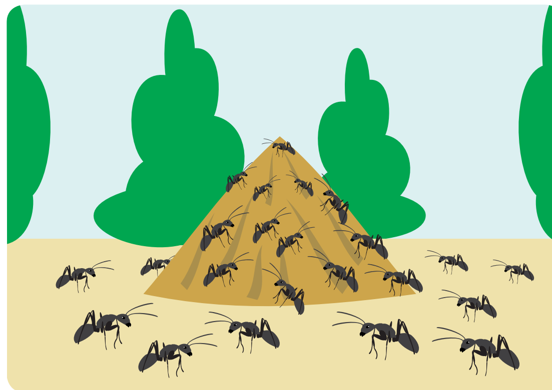
When comparing two numerals, if the first digit is the same in both numerals, how do we determine which numeral is greater?

Anthill 3



14,108

Anthill 4



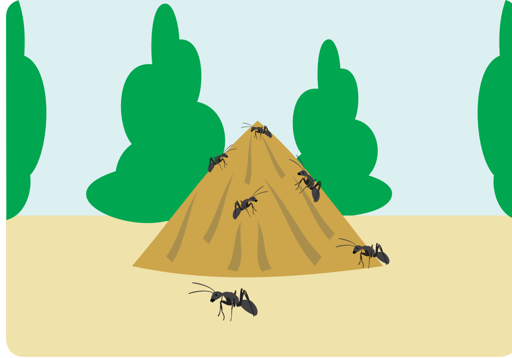
15,108

Photo Credit: (a) Rajath Raghav / Shutterstock.com, (b) kaa67alex / Shutterstock.com

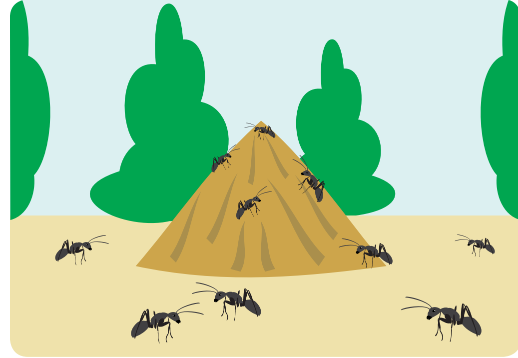
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Using Greater Than and Less Than to Compare Compare each anthill by writing < , > , or = in the space between them.

1.

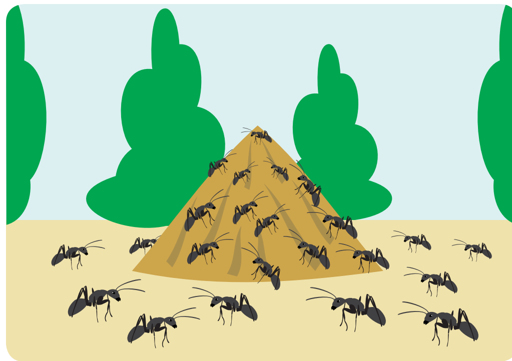


123,568

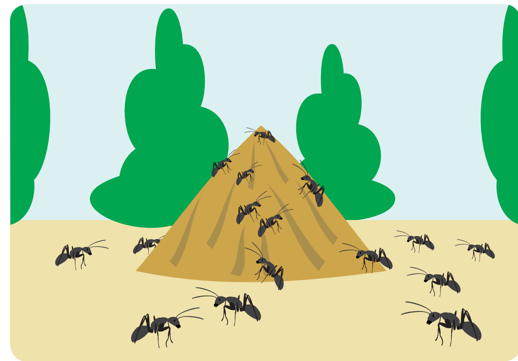


123,978

2.

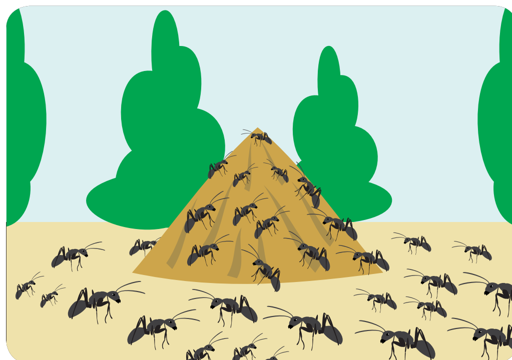


6,235,678

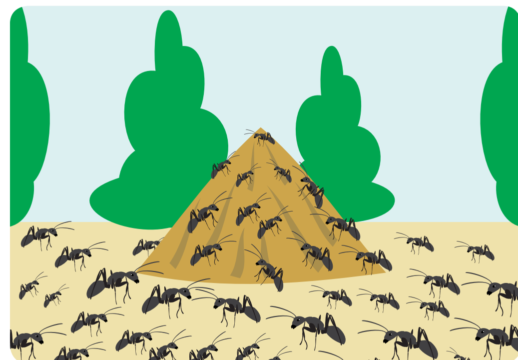


6,235,508

3.



2,450,890,007



2,500,000,000

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Write an Explanation

1. Go back to one of the anthill problems and write an explanation for how you knew which symbol to use.

2. Create numbers that make the comparison true. Use all the lines.

   ___ ___ ___, ___ ___ ___, ___ ___ ___ < 890,789,000

   2,456,800,900 > ___, ___ ___ ___, ___ ___ ___, ___ ___ ___

3. In the space provided, write each numeral that you created in the previous problem. Then, write a comparison symbol between the two numerals to express their relationship.

Photo Credit: Rajath Raghav / Shutterstock.com

CONNECT

Writing About Math When comparing large numbers, what strategies do you use to determine the greater number? Use words and numbers to explain your thinking.

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PRACTICE

1. Circle the symbol to compare the numbers.

5,680,421,226	> = <	5,598,672,565
89,418,147	> = <	89,418,247
940,668	> = <	940,669
100,000,000	> = <	99,999,999

2. Create a number in the Hundred Thousands that is less than (<) 612,793.

3. Create a number in the Millions that is greater than (>) 9,933,001.

4. Create a number in the Milliards that is greater than (>) 5,555,555,555.

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 8

Comparing Numbers in Multiple Forms



Quick Code
egm4011

Learning Targets

- I can compare numbers in multiple forms.
- I can describe the strategies I use to compare numbers.

ACCESS

Comparing Anthill Populations Work with a partner to compare the populations of the anthills by writing < , > , or = in the center column.

	Anthill	< , > , =	Anthill
1	40,000 + 3,000 + 100 + 10		40,000 + 3,000 + 100 + 20
2	five milliard, two hundred twenty million, five hundred-six thousand, forty		five milliard, two hundred twenty million, five hundred forty thousand, six
3	one million, nine hundred seventy-six thousand, eight hundred eighty-eight		1,000,000 + 900,000 + 70,000 + 6,000 + 800 + 80 + 8

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BUILD

Strategies for Comparison Review with a partner what you have learned about decomposed form and create a definition.

Decomposed form example:
(6 x 100,000) + (5 x 10,000) + (4 x 1,000) + (3 x 100)

Record the definition you and your partner wrote.

Decomposed form: ____

Record the class definition.

Decomposed form: ____

Work in pairs or small groups to compare each set of numbers in the chart. Use < , > or =. Think about *how* you are doing the comparisons (what are your strategies?).

		< , > , =	
1	14,780,064		14,790,064
2	5,193,492,500		five milliard, three hundred million, seven hundred fifteen thousand, forty-three
3	(7 x 100,000,000) + (4 x 10,000,000) + (9 x 10,000) + (8 x 10) + (1 x 10)		70,000 + 9,000 + 600 + 40 + 3
4	Seventeen million, four hundred twenty-five thousand, six hundred five		(1 x 10,000,000) + (7 x 1,000,000) + (4 x 100,000) + (2 x 10,000) + (6 x 100) + (5 x 1)
5	8,040,761,903		8,000,000,000 + 400,000,000 + 700,000 + 60,000 + 1,000 + 900 + 3
6	Four hundred twenty-three thousand, twelve		400,000 + 30,000 + 20,000 + 20 + 1

7. Put a star next to the set that was the easiest for you to compare.
   Put an x next to the set that was the hardest for you to compare.

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Number Battle

This game requires 3 players. 2 players are "builders," and 1 player is the "reader."

Each player needs a set of digit cards 0–9. Players will combine the three decks (30 cards), shuffle the cards, and place them face down in the middle.

1. Each builder draws 11 cards.
2. Each builder uses 10 of their cards to create the greatest number possible and discards the 11th card.
3. The reader will read each builder's number aloud.
4. The builders write their number and their partner's number in their Student Edition. Be sure to pay attention to how the numbers should be recorded for each round.
5. The builders compare their numbers and record the appropriate sign (< or >).
6. The builders discuss: Which place value did you use to determine which number was greater?
7. Rotate roles and play again.

Round	My Number	> or <	My Partner's Number
Standard Form			
Expanded Form			
Word Form			
Decomposed Form			

At the end of BUILD, circle the greatest number in your table and draw a box around the smallest number in your table.

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CONNECT

Writing About Math What are the most effective strategies for you when comparing numbers in multiple forms? Which forms are easiest for you to compare? Which are hardest? Why? Use words and numbers to explain your thinking.

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PRACTICE

1. Compare these anthills. Circle the one with the greatest number of ants. Put a box around the one with the least number of ants and draw stars on the two with an equal number of ants.

1	2	3	4	5
342,166,039	two hundred thirty-three million, two hundred sixty-three thousand, five hundred	900,000,000 + 10,000,000 + 300,000 + 20,000 + 2,000 + 100 + 4	(7 x 1,000,000,000) + (7 x 100,000) + (7 x 10) + (7 x 1)	(9 x 100,000,000) + (1 x 10,000,000) + (3 x 300,000) + (2 x 10,000) + (2 x 1,000) + (1 x 100) + (4 x 1)

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2. Create a numeral in the Hundred Thousands that is less than (<) 893,820.

3. Write a numeral in expanded form that is equal to (=) 2,445,232,197.

4. Create a numeral that is greater in the Ten Thousands place than (>) six milliard, four hundred million, seven hundred twenty thousand, nine hundred eleven.

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 9

Descending and Ascending Numbers


Quick Code
egm4012

Learning Targets

- I can **order** numbers in multiple forms.
- I can describe the strategies I use to order numbers.

ACCESS

Error Analysis Analyze the student's work and their answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Compare the numbers below using < , > , or =

89,906 ________ 100,513

Student's Answer: I think 89,906 > 102,513 because 8 is larger than 1.

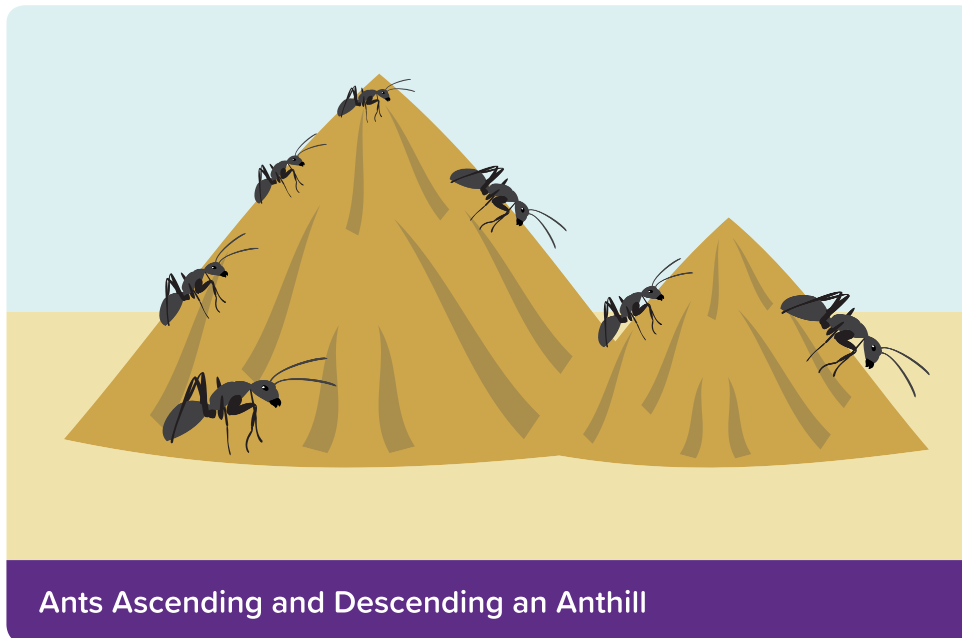
What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

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BUILD

Ascending and Descending Numbers Omar and Mariam have been reading about ants in different regions. Omar found the total number of ants that go in and out of an anthill each day. Mariam found the total number each week. The first data set shows the numbers that Omar found for his region each day for 5 days.



Ants Ascending and Descending an Anthill

1. List Omar's data in ascending order:

78,090   79,010   78,091   79,100   78,999

_______; _______; _______; _______; _______

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The second data set shows the numbers that Mariam found for her region each week for a month.

2. List Mariam's data in descending order. You may use word or standard form.
   - three milliard, ten million, one thousand, thirty-four
   - three milliard, one million, three hundred twenty-three thousand, three hundred ninety-one
   - three milliard, nine hundred ninety thousand, nine hundred ninety-two
   - three milliard, one hundred ten million, ninety-nine thousand, four hundred ninety-three

Photo Credit: Rajath Raghav / Shutterstock.com

3. List the numbers in ascending order. Use the form in which they are given.
   - four milliard, six hundred thousand, four
   - 461,014
   - four milliard six hundred thousand forty
   - (4 x 1,000,000,000) + (4 x 100,000) + (6 x 10)
   - 6,400,042

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4. List the following in ascending order. Use standard form.
   - (6 x 100,000) + (5 x 10,000) + (4 x 1,000) + (3 x 100) + (1 x 1)
   - six hundred fifty-four thousand, three hundred ten
   - 604,320
   - (6 x 100,000) + (5 x 10,000) + (4 x 1,000) + (3 x 100) + (1 x 10) + (1 x 1)
   - five hundred ninety-nine thousand, three hundred ten

5. List the numbers in descending order. Use standard form.
   - 5,000,000,000 + 40,000,000 + 5,000,000 + 7,000 + 90
   - (6 x 1,000,000,000) + (3 x 10,000,000) + (5 x 1,000,000) + (6 x 10,000) + (9 x 100)
   - five milliard, forty-one million, seven thousand, ninety
   - 6,000,000,000 + 40,000,000 + 5,000,000 + 10,000 + 7,000 + 90
   - 6,025,060,990

Photo Credit: Rajath Raghav / Shutterstock.com

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CONNECT

Writing About Math In the boxes, draw and label anthill images to help you remember the terms *ascending* and *descending*.

Ascending	Descending

Photo Credit: Rajath Raghav / Shutterstock.com

PRACTICE

1. Rewrite the numerals in standard form. Then, list the numerals in ascending order (least to greatest).

   three hundred sixty-two thousand, four hundred ninety-one; 363,906; (3 x 100,000) + (6 x 10,000) + (2 x 1,000) + (8 x 100) + (8 x 10); 300,000 + 60,000 + 4,000 + (9 x 10); Three hundred sixty-three thousand, five hundred eighty-nine

Standard Form	Ascending Order

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2. Create a numeral that is greater than 980,622, and a numeral that is less than 980,622. Then, write all three numerals in ascending order.

3. Create a numeral that is greater than 8,164,201,404 and a numeral that is less than 8,164,201,404. Then, write all three numerals in descending order.

Photo Credit: Rajath Raghav / Shutterstock.com

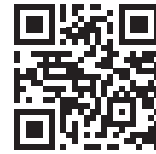
Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 10

Predicting the Unpredictable



Quick Code
egm4013

Learning Targets

- I can explain **front-end estimation** with numbers in multiple forms.
- I can use front-end estimation with numbers in multiple forms.

ACCESS

What Is Estimation? Look at the image of the ant colony. Omar and Mariam have been observing this ant colony, which had been destroyed in a flood. They are trying to determine if the ant colony has recovered and has more than 100 ants.

Photo Credit: (a) Rajath Raghav / Shutterstock.com, (b) Nataly Studio / Shutterstock.com



Anthill

- Do Omar and Mariam need to know exactly how many ants are in the anthill?
- Why or why not?
- About how many ants do you think are on the anthill?
- How did you decide on that estimate?

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BUILD

Exact or Not? If you used front-end estimation for each number in the table, what would you get? Record your answers in standard form.

	Number	Front-End Estimation
1	78,920,416	
2	8,723	
3	Nine milliard, four hundred twelve million, seventy-six thousand, five	
4	Four hundred thousand, seven hundred ninety-five	
5	9,000,000,000 + 800,000,000 + 70,000,000 + 5,000 + 60 + 5	
6	60,000,000 + 7,000,000 + 400,000 + 20,000 + 1,000 + 900 + 80 + 4	
7	(8 x 10,000) + (6 x 1,000) + (5 x 100) + (2 x 10) + (9 x 1)	

Highlight or circle the better front-end estimate for each problem in the table:

	Number	Front-End Estimate Choices
8	19,780,506	9,000,000 OR 10,000,000
9	Eight hundred twenty five thousand, six hundred nineteen	800,000 OR 8,000,000
10	2,567,814,900	Two milliard OR 2,000,000

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CONNECT

Writing About Math Does place value matter in front-end estimation? Why or why not? Use words and numbers to explain your thinking.

Photo Credit: Rajath Raghav / Shutterstock.com

PRACTICE

Use front-end estimation for the following numbers.

1. 78,512,900 ______________________
2. 3,900,500,231 ______________________
3. Seventy-five million, six hundred twenty-two thousand, four hundred thirteen ______________________
4. (5 x 10,000,000) + (8 x 100,000) + (9 x 10,000) + (4 x 100) + (6 x 1) ______________________
5. 800,000 + 7,000 + 400 + 60 ______________________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 11

Rounding Rules



Quick Code
egm4014

Learning Targets

- I can use multiple strategies to round numbers.
- I can identify which **estimation** strategy provides more **accurate** estimates.

ACCESS

Remember Rounding? Record what you and your partner remember about rounding. After the class discussion, add the class notes to your notes.

BUILD

Rounding Using the Midpoint Strategy For each problem that follows, record the midpoint of the number line. Then, identify where each number would go on the number line. Finally, round each number to the nearest thousand.

1. 6,700 ≈ ______________



2. 9,340 ≈ ______________

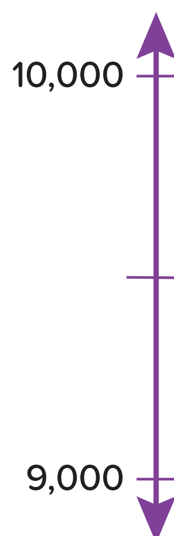
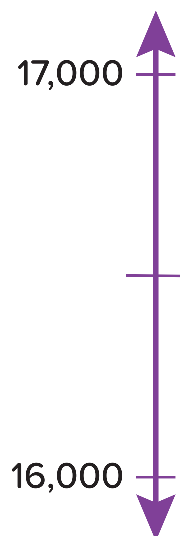


Photo Credit: Rajath Raghav / Shutterstock.com

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3. 16,401 ≈ ____________________



For each number, draw a number line, label the midpoint, and then round to the hundred thousands place.

4. 250,000 ≈ __________________________



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5. 700,500 ≈ ____________________



Rounding Rule:

Circle the digit, look next door.

5 or higher? Add one more.

4 or less? Let it rest.

Photo Credit: Rajath Raghav / Shutterstock.com

Rounding Rule Use the Rounding Rule strategy to round the numbers that follow to the given place value. Remember to circle the digit in the place value you are rounding and draw an arrow to show "looking next door." The first one is done for you.

Round the numbers to the nearest Thousand.

1. 234,432 ≈ ____________________
2. 7,578 ≈ ____________________

Round the numbers to the nearest Ten Thousand.

3. 290,290 ≈ ____________________
4. 7,435,026,353 ≈ ____________________

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Round the numbers to the nearest Million.

5. 5,367,544 ≈ ______________________

6. 2,453,000,601 ≈ ______________________

Round the numbers to the nearest Milliard.

7. 5,266,747,023 ≈ ______________________

8. 10,944,352,543 ≈ ______________________

CONNECT

Which Strategy is Best? **Rounding** numbers can help you determine whether or not your answer is **reasonable**. Look at the two rounding examples that follow.

47 →	40	Front-End Estimate Strategy	47	50	Rounding Rule Strategy
+ 31 →	+ 30		+ 31	+ 30	
	70			80	

Actual Answer: 47 + 31 = 78

Explain Which rounding strategy is more accurate. How do you know?

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PRACTICE

Follow the directions in each problem to round each number to the given place. Use the midpoint strategy or the Rounding Rule strategy.

1. A plane's altitude increased by 2,721 meters. Round this number to the nearest Thousand.

2. A runner ran 1,537 meters but describes the distance he ran with a rounded number. Round 1,537 to the nearest Hundred.

3. A record number of 23,386 ants live in colony A. Round this number to the nearest Ten Thousand.

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT

2

Theme 1 | Number Sense and Operations

Unit 2
Addition and Subtraction Strategies





Calculation Ants

Unit Video Questions

Omar and Mariam are investigating ant movement in and out of the ant mound. Soon they may need a faster way to add and subtract.



Quick Code
egm4050

- ☐ How can you use patterns to determine strategies?
- ☐ What are some patterns you have observed this week?

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CONCEPT 1

Using Addition and Subtraction Strategies

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LESSON 1
Properties of Addition


Quick Code
egm4052

Learning Target

- I can identify the properties of addition.
- I can explain the properties of addition.
- I can investigate to determine if addition properties apply to subtraction.

ACCESS

Expanded Form Review Listen as your teacher reads numerals in expanded form. Write the numbers in standard form.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________

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BUILD

Additive Identity Property Solve the following problems.

1. 2,345 + 0 ______________	2. 0 + 12,567,109 ______________

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3. What did you notice about the problems?

4. Write a definition of the Additive Identity Property in your own words.

Commutative Property Solve the following problems.

5. 5 + 7 + 8 + 3 ______	6. 8 + 7 + 3 + 5 ______	7. 7 + 5 + 8 + 3 ______	8. 3 + 7 + 8 + 5 ______

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9. What did you notice about the problems?

10. Write a definition of the Commutative Property in your own words.

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Associative Property Solve the following problems. Remember to solve what is in the parentheses first.

11. (10 + 4) + 20 + 17 __________	12. 10 + (4 + 20) + 17 __________	13. 10 + 4 + (20 + 17) __________

14. What did you notice about the problems?

15. Write a definition of the Associative Property in your own words.

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Do the Properties Apply? With your Shoulder Partner, answer the questions that follow.

Circle the property you and your partner have been assigned.

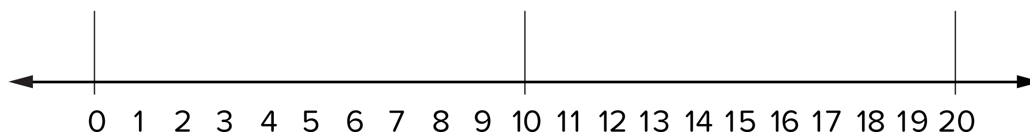
Associative **Commutative** **Additive Identity**

What is your prediction? Will your assigned property also be true for subtraction? Circle Yes or No.

Yes **No**

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Create two problems to investigate whether your property applies to subtraction. You may use the number line to help you subtract.



Does your property apply to subtraction?

Yes **No**

Explain why or why not.

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CONNECT

Writing About Math Describe what you discovered about the properties of addition and whether they apply to subtraction. Be sure to explain your findings. Use words and example equations to explain your thinking.

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PRACTICE

Solve the problems and circle the **property** (or properties) illustrated by the problems. Then, write and solve your own problem showing the same property and using the same numbers.

Circle One			Write your own
Associative Commutative Additive Identity	15 + 20 + 13 = ______	13 + 15 + 20 = ______	
Associative Commutative Additive Identity	0 + 4,502 = ______		
Associative Commutative Additive Identity	(40 + 21) + 36 = ______		
Associative Commutative Additive Identity	200 + 0 + 43 = ______	43 + 0 + 200 = ______	

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2
Review Mental Math Strategies


Quick Code
egm4053

Learning Targets

- I can apply a variety of strategies to add and subtract mentally.
- I can explain why it is important to be able to do **mental math**.

ACCESS

Mental Math Strategies Look at the problems and the explanations that follow. All of these are mental math strategies. Highlight or circle the one that makes the most sense to you and share your thinking with a partner.

1. 304 + 399 = 703
   Student explanation: I used **Compensate to Make a Benchmark**. I thought of 399 as 400. 304 + 400 is 704 but I added one too many, so I took one away to get the sum. 704 – 1 = 703.
2. 785 – 770 = 15
   Student explanation: I used **Add to Subtract**. I counted up from 770 to get to 785.
3. 489 + 134 = 623
   Student explanation: I use **Break Up and Bridge**. I added 400 + 100 to get 500. I added 80 + 30 to get 110, so already I know 500 + 110 is 610. Then I added 9 + 4 to get 13, so 610 + 13 = 623.
4. 74 – 19 = 55
   Student explanation: I used **Compensate to Make a Benchmark**. I thought of 19 as 20. 74 – 20 = 54 but I took off one too many, so I needed to add one back. 54 + 1= 55.

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5. 156 – 47 = 109
Student explanation: I used **Break Up and Bridge**. I broke up 47 into 40 and 7. I took 40 away from 156 and got 116. Then I took away 7 more and found the difference was 109.

BUILD

Solving with Mental Math Strategies Use the chart that follows to help you practice the strategies as you solve the problems mentally. Try each strategy at least one time.

Front-End Estimation	Add or subtract only the largest place values in each number to produce an estimate (that may not be close to the actual answer). For example, in the problem 167 – 83, you can think 100 – 80 = 20.
Rounding	Select one place value for each number. Determine which multiple of 10, 100, 1,000 (and so on) it is closest to and then add or subtract for a more accurate estimate. For example, in the problem 167 – 83, you can think 170 – 80 = 90 (a far more accurate estimate).
Compensate to Make a Benchmark Number	Regroup the numbers in a problem to create numbers that are easier to add or subtract mentally. For example, with 59 + 22, you can think "60 + 22 is 82 but I added one too many so the sum will be 1 less, or 81." Or for subtraction, with 17 – 9, you can think "17 – 10 is 7, but I subtracted 1 too many, so the difference is one more, or 8."
Break Up and Bridge	Break up the number being added or subtracted into numbers that are easier to add or subtract mentally (expanded form can help). For example, with 92 – 26, you can think "92 – 20 is 72 and then take 6 more away is 66," or for 537 + 208, you can think, "537 and 200 is 737, and 737 plus 8 is 745."
Add to Subtract	Count up from the subtrahend to the minuend. For example, with 92 – 67, you can think "67 + 3 = 70; 70 + 20 = 90; 90 + 2 = 92. 3 + 20 + 2 = 25, 92 – 67 = 25."

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Problem	Mental Math Strategy Chosen	Solution	Was this an effective strategy? Why or why not?
17 + 29			
92 – 11			
101 – 98			
32 + 11			
76 – 68			
83 + 17			

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CONNECT

Writing About Math Why is it important to be able to add and subtract mentally? Which mental math strategies are most effective for you? Why?

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PRACTICE

Solve the problems using the Compensate to Make a Benchmark strategy. Show your work.

1. 43 + 9 =	2. 504 + 199 =	3. 92 – 39 =	4. 953 – 499 =

Solve the problems using the Break Up and Bridge strategy. Show your work.

5. 75 + 27 =	6. 993 + 19 =

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3

Addition with Regrouping


Quick Code
egm4054

Learning Targets

- I can add multidigit whole numbers.
- I can **estimate** to check the reasonableness of my answer.

ACCESS

Error Analysis Analyze the student's work. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Moaaz thinks that 4 – 0 would have the same answer as 0 – 4 because any number minus 0 equals that number.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

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BUILD

Estimate and Solve Work with your partner to estimate the sums and then solve the problems.

1. 579 →
   + 62 → +

2. 8,049 →
   + 6,199 → +

CONNECT

Bridging Ants and Addition There are many different types, or *genera*, of ants. Army ants are known for being aggressive and are good hunters. One of the more interesting things that army ants do is create living bridges to help them span an elevated distance. Most of the bridges are made with around 50 ants. Once these bridges are complete, all the ants are able to safely move to the other side.


Ants Forming a Bridge

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1. A colony of ants is on a march through the jungle looking for food. On this march they made 2 bridges. The first bridge is composed of 142 ants. The second bridge is composed of 165 ants. How many ants were needed for both bridges? Show your work. Then, explain how you know your answer is reasonable.

Estimate

Exact

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PRACTICE

Round to estimate the sums. Then, solve the problems to find the exact answer. Show your work.

1.
$$\begin{array}{r} 593 \\ +\ 194 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 3{,}520 \\ +\ 2{,}401 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 34{,}013 \\ +\ 9{,}340 \\ \hline \end{array}$$

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4. Abeer and Ehab are traveling from Aswan to Alexandria. They will travel 514 km on the first day to Asyut. They will travel 597 km from Asyut to Alexandria on the second day. How many kilometers will they travel in all?

5. A Saharan Silver ant is the fastest ant on the planet. It can move about 855 mm a second. If this ant could maintain this speed for 2 seconds, how far would it go?

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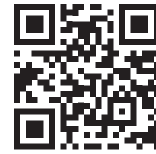
Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 4

Subtraction Strategies


Quick Code
egm4055

Learning Targets

- I can use place value to decompose numbers in order to subtract.
- I can explain the importance of finding patterns and relationships to solve problems.

ACCESS

Using 10s Follow your teacher's directions to mentally solve the problems.

1. 3 + 7
2. 3 + 5 + 7
3. 7 + 6 + 3

4. 9 + 1
5. 1 + 7 + 9
6. 9 + 6 + 1

7. 7 + 7 + 3 + 3
8. 9 + 9 + 1 + 1

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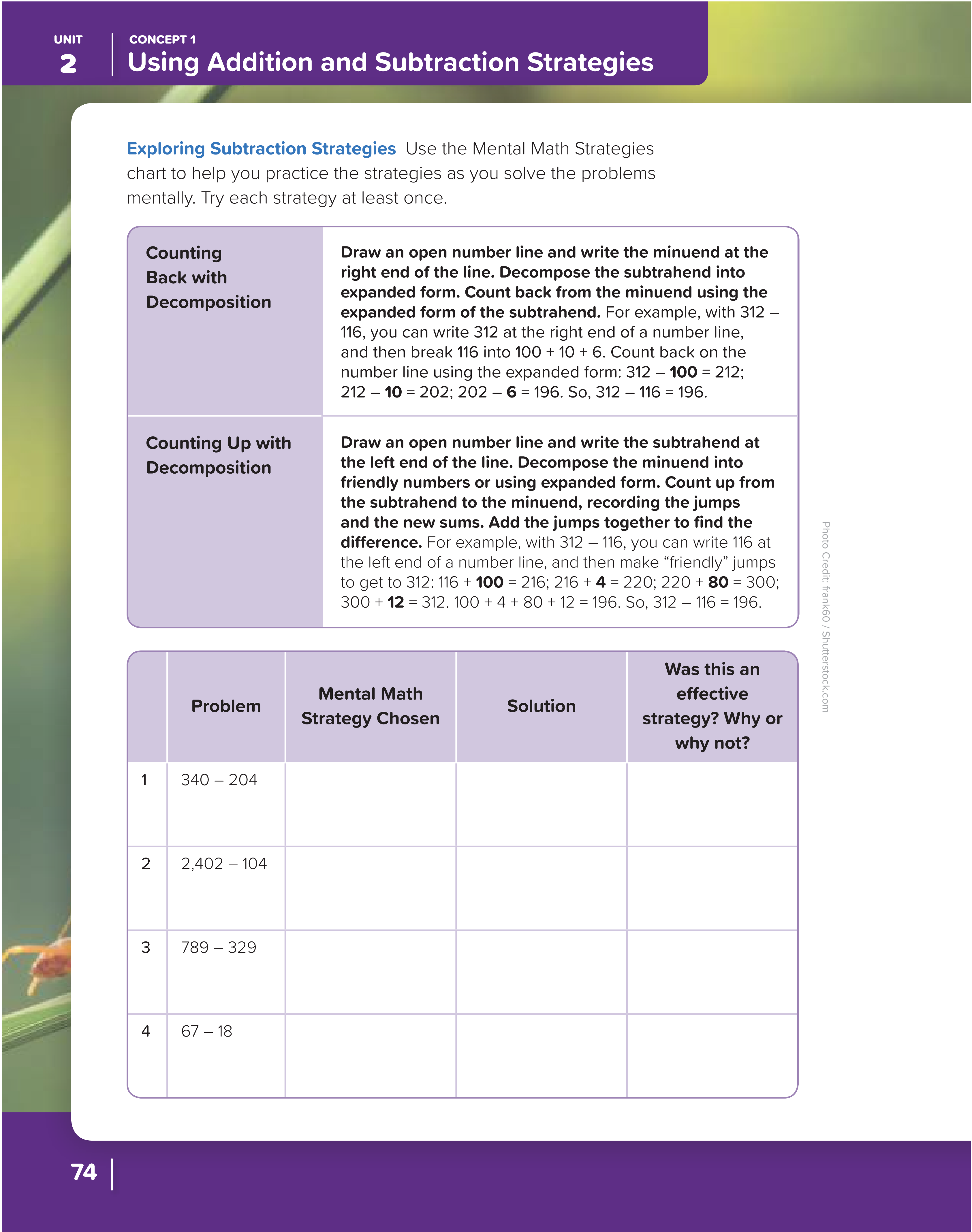
BUILD

Subtraction Strategies Solve the problem. Use your favorite strategy.

$$\begin{array}{r} 453 \\ -\,125 \\ \hline \end{array}$$

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Using Addition and Subtraction Strategies



Exploring Subtraction Strategies Use the Mental Math Strategies chart to help you practice the strategies as you solve the problems mentally. Try each strategy at least once.

Counting Back with Decomposition	**Draw an open number line and write the minuend at the right end of the line. Decompose the subtrahend into expanded form. Count back from the minuend using the expanded form of the subtrahend.** For example, with 312 – 116, you can write 312 at the right end of a number line, and then break 116 into 100 + 10 + 6. Count back on the number line using the expanded form: 312 – **100** = 212; 212 – **10** = 202; 202 – **6** = 196. So, 312 – 116 = 196.
Counting Up with Decomposition	**Draw an open number line and write the subtrahend at the left end of the line. Decompose the minuend into friendly numbers or using expanded form. Count up from the subtrahend to the minuend, recording the jumps and the new sums. Add the jumps together to find the difference.** For example, with 312 – 116, you can write 116 at the left end of a number line, and then make "friendly" jumps to get to 312: 116 + **100** = 216; 216 + **4** = 220; 220 + **80** = 300; 300 + **12** = 312. 100 + 4 + 80 + 12 = 196. So, 312 – 116 = 196.

	Problem	Mental Math Strategy Chosen	Solution	Was this an effective strategy? Why or why not?
1	340 – 204			
2	2,402 – 104			
3	789 – 329			
4	67 – 18			

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CONNECT

Writing About Math Briefly review the Mental Math Strategies anchor chart in your classroom. Then, answer the following questions:

- Why do you think there are so many different ways to solve problems?
- What does that tell you about the importance of finding patterns and relationships in mathematics?
  (Hint: Do not try to think of the "right" answer. Just share your thinking.)

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Ant Colony Traveling

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PRACTICE

Solve the problems using a strategy of your choice.

$$\begin{array}{r} 734 \\ -\ 243 \\ \hline \end{array}$$

$$\begin{array}{r} 6{,}245 \\ -\ 2{,}400 \\ \hline \end{array}$$

$$\begin{array}{r} 839 \\ -\ 199 \\ \hline \end{array}$$

$$\begin{array}{r} 5{,}200 \\ -\ 2{,}201 \\ \hline \end{array}$$

$$\begin{array}{r} 27{,}340 \\ -\ 18{,}930 \\ \hline \end{array}$$

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 5

Subtraction with Regrouping



Quick Code
egm4056

Learning Target

- I can use place value to help me subtract with regrouping.
- I can estimate to check the reasonableness of my answers.

ACCESS

Error Analysis Analyze the student's work and answer in the space provided. Identify what the student did correctly and what they did incorrectly, and then try to solve the problem correctly.

Solve: $521 - 37 = ?$

Student Work:

521 - 37 = 516

500 20 1 30 7

500 - 0 = 500
30 - 20 = 10
7 - 1 = 6

516

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What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

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BUILD

Subtraction with Regroup Follow your teacher's directions to complete this learning activity.

$$\begin{array}{r} 3{,}328 \\ -\ 2{,}164 \\ \hline \end{array}$$

Use drawings to model 3,328 on the place value chart

Thousands			Ones		
H	T	O	H	T	O

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Ant Facts and Algorithms Read the short article. Then, follow your teacher's directions to complete the activity.

Can Ants Swim?

Some ants can swim, and some drown. It depends on the species. Some researchers took 35 species of tropical ants and dropped them into the water. Some of them were amazing swimmers, especially trap jaw ants. One species could swim an amazing 16–17 cm per second. That means in a minute the ant could swim 1,020 cm or approximately 10 meters!

Fire ants cannot swim, but they can join their legs to form a circular raft to survive floods. Sometimes, the entire ant colony will join legs to survive.

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Ant Swimming

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Using Addition and Subtraction Strategies

1. A trap jaw ant wanted to cross a river that was 3,548 cm across. The ant had already swum 1,672 cm. How much farther does the ant have to go?

2. Two colonies of fire ants were stuck in a flood and made floating rafts to survive. The first colony had approximately 1,267 ants and the second had 3,452 ants. How many more ants were in the second colony?



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3. A fire ant colony 255,000 ants. A *Gigantiops destructor* ant colony has 6,200. What is the difference between the size of the two colonies?

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CONNECT

Four Corners Follow your teacher's directions to participate in the Four Corners activity. Record your chosen strategy.

PRACTICE

Photo Credit: frank60 / Shutterstock.com

Use the subtraction algorithm to solve the problems. Then, round each number to the nearest Thousand to check the reasonableness of your answers.

1. 6,625
   – 4,417

2. 23,640
   –14,635

3. 25,884
   – 18,875

4. 1,816
   – 1,066

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Use the standard subtraction algorithm to solve the story problem. Record your equation and show your thinking. Then, round each number to the nearest Million to check the reasonableness of your answers.

5. It takes 15,422,140 ants to move a log that weighs 77 kg. It takes approximately 6,350,300 ants to move a rock that weighs 32 kg. How many more ants does it take to move the log than the rock?

Photo Credit: frank60 / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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CONCEPT 2

Solving Multistep Problems

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LESSON 6

Bar Models, Variables, and Story Problems



Quick Code
egm4058

Learning Targets

- I can use letters to represent unknown quantities in equations.
- I can use **bar models** to represent and solve story problems.
- I can solve equations that include **variables**.

ACCESS

Introducing Variables What does it mean to be balanced?

Look at the image of the triangle. What do you notice about it? Discuss your observations with your Shoulder Partner.

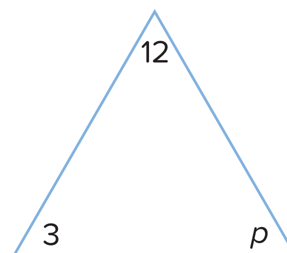


Photo Credit: ErikJensen / Shutterstock.com

BUILD

Bar Models Read the following problems. Create a bar model and an equation for each problem, and then solve.

1. There are 5,328 ants in the colony. In the colony, 2,164 ants are females and the rest are males. How many male ants are in the colony?

Bar Model:

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Equation:

Solution:

2. There are 20,000 ants in the colony. In the colony, 12,000 are females and the rest are males. How many male ants are in the colony?

Bar Model:

Equation:

Solution:

Photo Credit: ErikJensen / Shutterstock.com

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Ants Foraging for Food

3. In colony A there are 1,200 ants. Some ants are out foraging for food and supplies, and 700 ants are taking out the colony's trash. How many ants are foraging for food and supplies?

Bar Model:

Equation:

Solution:

Photo Credit: (a) ErikJensen / Shutterstock.com, (b) ervin herman / Shutterstock.com

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4. There are 12,000 species of ants. Of these 12,000 species, 2,500 species live in Africa and the rest live in other parts of the world. How many species do not live in Africa?

Bar Model:

Equation:

Solution:

Photo Credit: ErikJensen / Shutterstock.com

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Solving Equations with Variables Create a bar model to solve the following problems.

1. $14{,}000 - n = 6{,}000$

Bar Model:

Solution:

Photo Credit: ErikJensen / Shutterstock.com

2. $b - 53{,}500 = 75{,}200$

Bar Model:

Solution:

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3. $725{,}625 + c = 935{,}075$

Bar Model:

Solution:

4. $13{,}280 - d = 5{,}420$

Bar Model:

Solution:

Photo Credit: ErikJensen / Shutterstock.com

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5. $e + 205{,}925 = 810{,}775$

Bar Model:

Solution:

Photo Credit: ErikJensen / Shutterstock.com

CONNECT

Writing About Math Write a story problem involving addition or subtraction, where you need to find the unknown. Then write the equation and draw a bar model of the equation. Lastly, solve for the variable and check.

Word Problem:		
Equation:	**Bar Model (drawn):**	**Solve and Check:**

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PRACTICE

Your goal is to make it from START to END. Begin in the game space next to START. To move to the next game space, the number in the path MUST be a solution to the game space you are in. You are only required to solve the problems needed to navigate through the puzzle. Use arrows to show the path you took. When you have reached the END, you have completed the maze. Good luck!

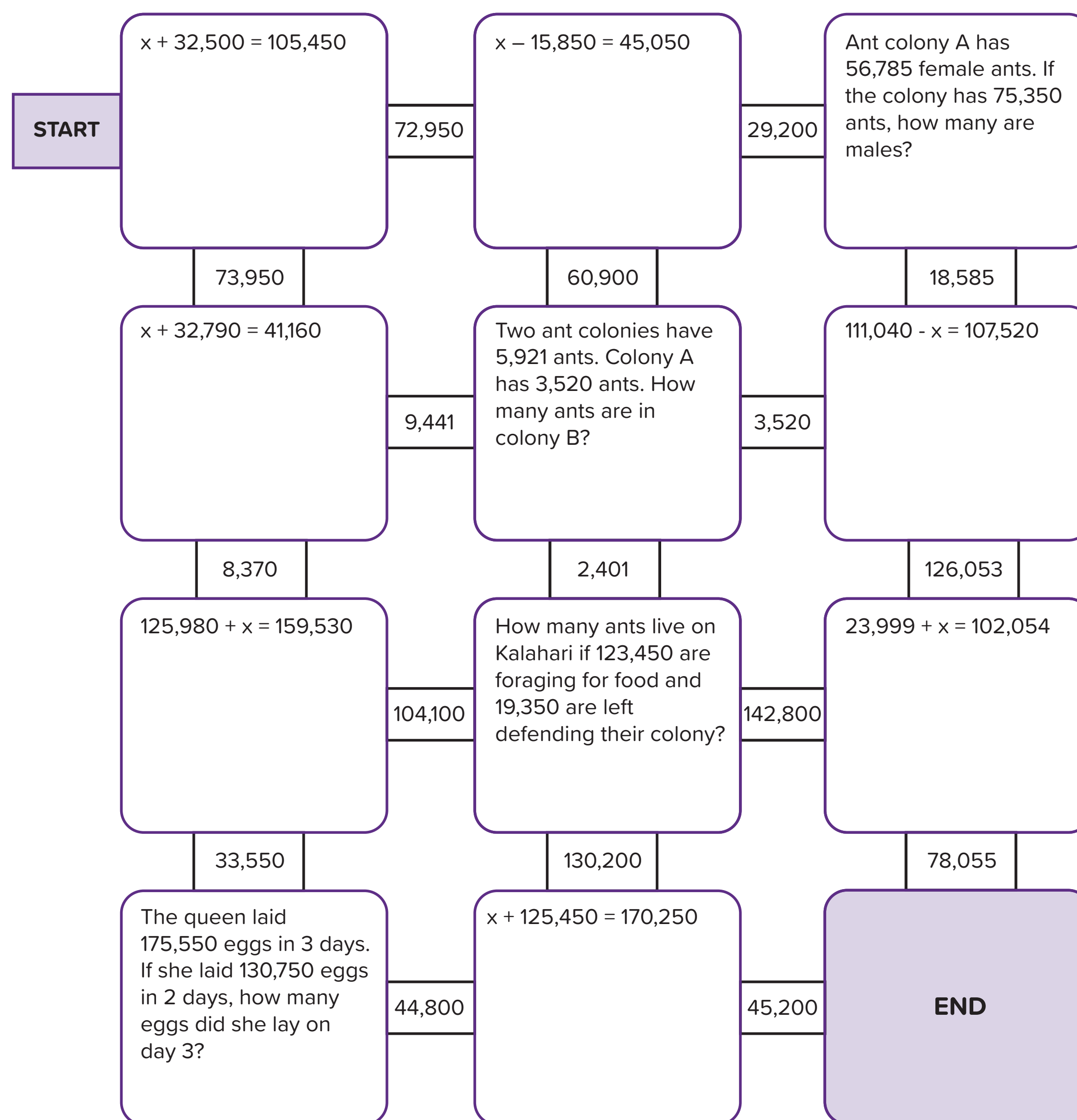


Photo Credit: ErikJensen / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 7

Solving Multistep Story Problems with Addition and Subtraction



Quick Code
egm4059

Learning Targets

- I can solve multistep story problems.
- I can explain how I solved multistep story problems.

ACCESS

Hidden Question Answer the following questions:

1. Omar found a website created to study ant colonies. He saw that there were 1,025 ants in Colony A on Wednesday. On Friday, 101 ants leave the colony. How many ants are left in Colony A?

Photo Credit: ErikJensen / Shutterstock.com

2. Mariam found the same website and saw that there were 1,555 ants in Colony B. How many more ants are in Colony B than in Colony A?

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BUILD

Putting It Together Combine the two given story problems to create one story problem.

1. Mariam saw on the website that several smaller Pharaoh ant colonies were joining together to form a larger colony. On Monday, 1,725 ants joined together with 22,750 ants. Then, another 6,075 ants joined. How many ants were in the larger colony on Monday?

   Omar checked the website on Friday and learned that there were now 50,750 ants in the colony. How many ants had joined the colony since Monday?

New multistep story problem:

____

____

____

____

Highlight or circle the hidden question in the multistep story problem you wrote.


Ant Hills

Photo Credit: (a) ErikJensen / Shutterstock.com, (b) ARUN MANGAL / Shutterstock.com

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Solving Multistep Story Problems Read the Steps to Solving Story Problems. Then, read the story problem. Next, read the steps a student took to solve the problem and number the steps from 1 to 6 to put them in the correct order.

Steps to Solving Story Problems

1. Circle important numbers and labels.
2. Underline questions.
3. Draw a box around operation clues.
4. Examine the information:
   - What is known?
   - What is unknown?
   - What is the hidden question?
5. Use what is known to answer the hidden question.
6. Use the new information to solve the problem and find the unknown.

Photo Credit: ErikJensen / Shutterstock.com

1. Ahmed had a pie with 340 calories for breakfast. Then, Ahmed had a glass of milk, an apple, and a chicken sandwich for lunch. The milk had 190 calories, the apple had 85 calories, and the chicken sandwich had 255 calories. If the average adult can eat 2,000 calories per day, how many more calories can Ahmed eat today?

   _______ I subtracted 870 from 2,000. The answer is 1,130, so Ahmed can eat 1,130 more calories today.

   _______ I drew a box around “how many more.”

   _______ I added the calories of the foods Ahmed has eaten to answer the hidden question (how many calories Ahmed has already eaten). The answer is 870 calories.

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_______ I circled 340 calories, 190 calories, 85 calories, 255 calories, and 2,000 calories.

_______ I identified the known information (what Ahmed ate and how many calories each item had; the average adult is supposed to eat 2,000 calories per day). I identified the unknown information (how many calories Ahmed has already eaten; how many more calories Ahmed can eat).

_______ I underlined "how many more calories should Ahmed eat today?"

Use the problem-solving steps to solve the story problems. Remember, you will have to answer the hidden question first and then answer the main question. Be sure to show your work.

2. The ant colony website hopes that a new colony with up to 173,500 will form. If a colony of 27,385 ants and a colony of 52,890 ants join the new colony, how many more ants can join?

Photo Credit: ErikJensen / Shutterstock.com

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3. The Great Pyramid had 59,000 visitors in January, 27,525 visitors in February, and 32,975 visitors in March. They expect to have 150,000 visitors by the end of April. How many visitors need to show up in April to reach this count?

Photo Credit: ErikJensen / Shutterstock.com

4. New Valley has a population of 256,088. If Matrouh has a population of 429,999 and South Sinai has a population of 108,951, how many more people do Matrouh and South Sinai have combined than New Valley?

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CONNECT

Writing About Math If you had to teach a friend how to solve multistep story problems, what would you tell them? What strategies would you recommend? What helpful hints would you share?

PRACTICE

Use the problem-solving steps to solve the multistep story problems. Show your work.

1. The Nile River is approximately 6,650 kilometers long. Kareem and his family travel the Nile River from one end to the other end. If they travel 1,075 kilometers in January, then 1,120 kilometers in February, and then 1,325 kilometers in March, how many more kilometers do they still need to travel to reach the other end?

Photo Credit: ErikJensen / Shutterstock.com

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2. Aswan has a population of 1,575,914. If Luxor has a population of 1,333,309 and Red Sea has a population of 383,796, how many more people do Luxor and Red Sea have combined than Aswan?

Photo Credit: ErikJensen / Shutterstock.com

3. Hazem and Menna are monitoring ant colonies on the website. Hazem has been monitoring an ant colony with 132,890 ants. Menna has been monitoring an ant colony with 57,024 ants and another colony with 72,999 ants. Who has been monitoring more ants? How many more?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT

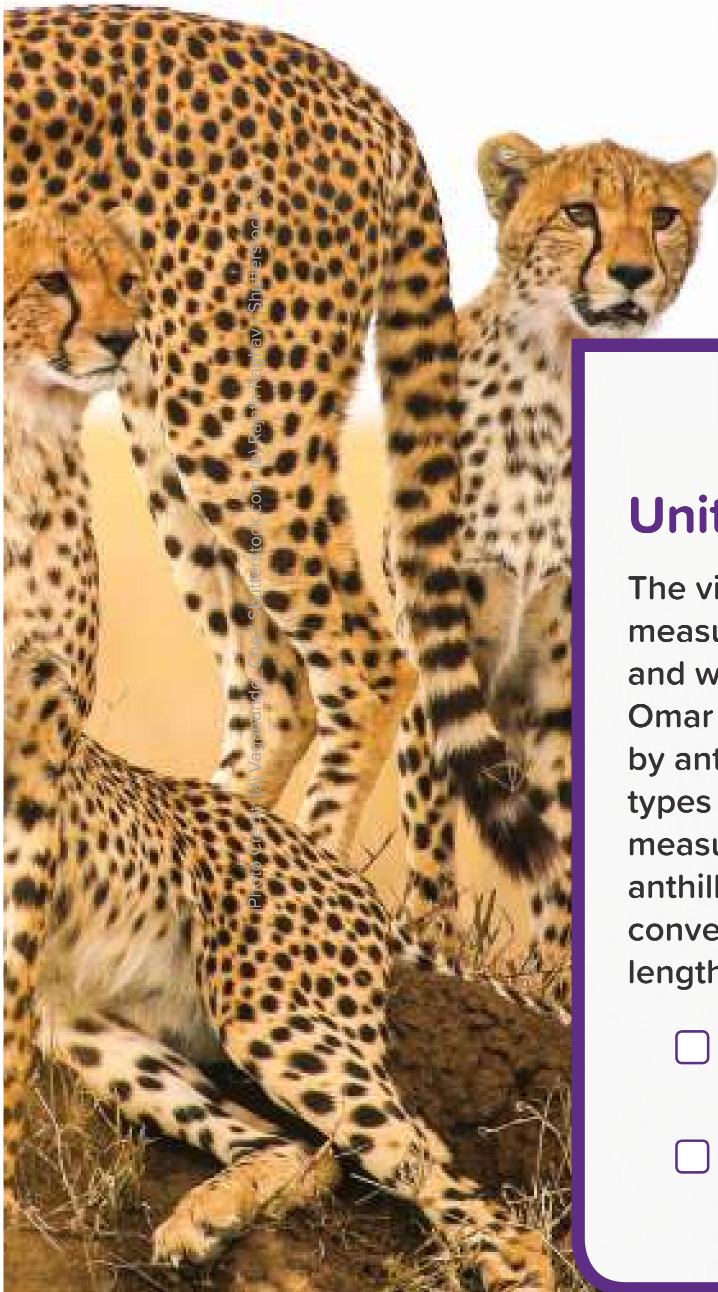
3

Theme 1 | Number Sense and Operations

Unit 3 Concepts of Measurement

Photo Credit: Vaganundo_Che / Shutterstock.com

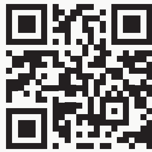






It's an Ant's Life

Unit Video Questions



Quick Code
egm4027

The video It's an Ant's Life uses measurement to describe the life and work of different types of ants. Omar and Mariam are fascinated by ants and are exploring different types of anthills. They want to use measurement to compare. Because anthills vary greatly in size, they may need help converting measurements between units of length.

- ☐ How big was the biggest ant or anthill you have ever seen?
- ☐ Why would Omar and Mariam need to change units of measure to compare anthills?

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CONCEPT 1

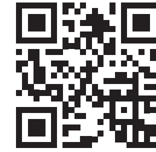
Metric Measurement



Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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LESSON 1
Ant Travel


Quick Code
egm4016

Learning Targets

- I can explain the relationship between metric units of **length**.
- I can **convert** between metric units of length.

ACCESS

Measurement Review Circle the best unit to measure each length.

1. Height of a student

   Kilometer   Meter   Centimeter   Millimeter

2. Distance between home and school

   Kilometer   Meter   Centimeter   Millimeter

3. Length of the Nile River

   Kilometer   Meter   Centimeter   Millimeter

4. Length of an ant

   Kilometer   Meter   Centimeter   Millimeter

5. Distance from Cairo to Alexandria

   Kilometer   Meter   Centimeter   Millimeter

Fill in the blanks to answer the following questions. Think of things that could be measured in each unit.

6. ____________________ is best measured in kilometers

   because ____________________.

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7. ______________ is best measured in meters because

______________.

8. ______________ is best measured in centimeters

because ______________.

9. ______________ is best measured in millimeters

because ______________.

BUILD

Metric Units View and discuss the Metric Conversion chart with your Shoulder Partner.

Kilo-	Hecto-	Deca-	Unit	Deci-	Centi-	Milli-
1,000 units	100 units	10 units	1 unit	1/10 unit	1/100 unit	1/1,000 unit

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

Work with your Shoulder Partner to fill in the blanks that follow to help you remember the relationship.

1 km = ________ m

1 m = ________ cm

Decomposing and Renaming Unit Conversions Fill in the table with proper conversions.

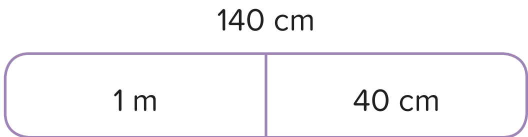
Fill in the table with proper conversions.

	Kilometer	Meter
1		1,000
2	3	
3		40,000

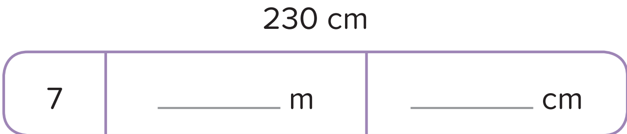
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	Meter	Centimeter
4	1	
5		300
6	10	

Look at the following example:



Convert the following lengths into the given units in the bar models. Use the previous example to help you.



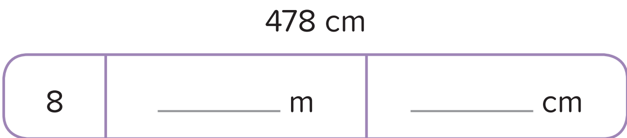




Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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Carpenter Ant Nest

Photo Credit: (a) Thammanoon Khamchalee / Shutterstock.com, (b) Henrik Larsson / Shutterstock.com

Answer the story problems. Use your conversion tables to help you.

10. Carpenter ants are so named because they build their nests inside wood. They do not eat this wood. Instead, they create a smooth tunnel system through it for their colony. Carpenter ants can be up to 3 centimeters long. A mature colony can have up to 100,000 ants. If the ants lined up end to end and each ant is 1 centimeter long, how many meters long would a line of 100,000 ants be?

11. Using the information from the first item, how many kilometers long would the line of 100,000 ants be?

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CONNECT

View the image of an excavated ant colony's anthill.



Excavated Anthill

Photo Credit: (a) Thammanoon Khamchalee / Shutterstock.com, (b) Hennadii Filchakov / Shutterstock.com

The Nest When scientists studied the anthill, they found that it was 8 meters deep.

1. How many centimeters would that be? Show your work.

2. The colony had to move tons of soil to construct their nest. The worker ants had to carry loads of soil 1 kilometer to the surface. If one ant carried 10 loads of soil in a week, how many kilometers did it travel while moving soil? How many meters? How many centimeters?

   ____________________ km

   ____________________ m

   ____________________ cm

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PRACTICE

Convert the following.

1. 4 m 18 cm = ______________________ cm
2. 18 m 14 cm = ______________________ cm
3. 8 km 14 m = ______________________ m
4. 27 km 55 m = ______________________ cm
5. If one black ant can walk 250 meters in 1 hour, how many hours will it take to walk 1 kilometer?

6. If the same black ant walked for 10 hours, how far would it go? Express your answer in kilometers and meters.

Photo Credit: Thammanoon Khamchalee / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2

The Weight Can Wait



Quick Code
egm4017

Learning Targets

- I can explain the relationship between metric units of **mass**.
- I can convert between metric units of mass.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Convert 7 meters 45 centimeters to centimeters.

Student's answer: 7 m 45 cm = 7,045 cm

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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BUILD

Mass Review Share what you remember about mass. Take turns sharing ideas of objects that would be weighed in grams. Talk to your Shoulder Partner about the similarities between the relationship between mass measurements and the relationship between length measurements from the last lesson.

Fill in the blank to help you remember the relationship and then complete the conversions.

1 kg = ________ g

Conversion and Application Look at the following Conversion Example:

2,300 g
1,000 g = 1 kg
2,000 g = 2 kg
+ 300 g

2 kg	300 g

Work with a partner to complete the conversions. Use the previous example to help you.

1. 3 kg = ________ g
2. 8 kg = ________ g
3. ________ kg = 5,000 g
4. 4 kg = ________ g
5. ________ kg = 30,000 g

Convert the masses into the units on the bar models.

6. 4,590 g

________ kg	________ g

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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7. 8,400 g

________ kg	________ g

8. ________ g

7 kg	414 g

Answer each question. Use words, pictures, or numbers to explain your thinking.

9. A colony of black ants is estimated to weigh 3,493 grams. Rewrite that number using kilograms and grams.

Photo Credit: (a) Thammanoon Khamchalee / Shutterstock.com, (b) Zeljko Rajic / Shutterstock.com



Black Ant

10. A different ant colony is estimated to weigh 14 kilograms and 89 grams. Rewrite that weight in grams.

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CONNECT

Writing About Math When might you need to convert grams to kilograms or kilograms to grams in your daily life? How do the mental math strategies you have learned help you convert units of measurement? Work independently to respond to the prompt.

PRACTICE

1. Convert:

   2,456 g = ________ kg ________ g

2. Convert:

   5,235 g = ________ kg ________ g

3. Convert:

   7,324 g = ________ kg ________ g

4. Convert:

   4,535 g = ________ kg ________ g

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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5. The table shows the total weight of food harvested by a colony's army ants over 7 days. Use the table to answer the question.

Day	Weight of food harvested
1	45 g
2	60 g
3	50 g
4	35 g
5	40 g
6	55 g
7	60 g

How much food did the workers harvest in their lifespan?

Photo Credit: Thammanoon Khamchalee / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3

Fill It Up



Quick Code
egm4018

Learning Targets

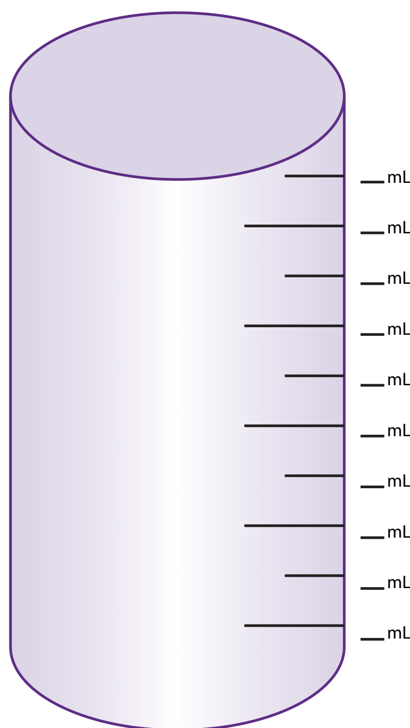
- I can explain the relationship between metric units of **capacity**.
- I can convert between metric units of capacity.

ACCESS

Number Talk Listen to each problem your teacher reads aloud. Use benchmark numbers and the mental math strategies you have learned to solve each one. Be prepared to discuss how you solved each problem.

BUILD

Decomposing and Renaming Fill in the blanks using the cylinder to show how many milliliters it takes to make 1 liter. Then, answer the question.



1 L = ______________________ mL

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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Work with a partner to solve the problems.

1. 6 L = ________ mL

2. 9 L = ________ mL

3. ________ L = 6,000 mL

4. 3 L = ________ mL

5. ________ L = 10,000 mL

Look at the following Conversion Example:

5,403 mL
1,000 mL = 1 L
5,000 mL = 5 L
+ 403 mL

5 L	403 mL

Using the conversion examples above, convert the following weights into the given units on the bar models.

6. 9,425 mL

______ L	______ mL

7. 6,360 mL

______ L	______ mL

8. ________ mL

8 L	910 mL

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

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Solve each problem.

9. A car is filled with 45 liters of petrol. How many milliliters would that be?

10. Use the recipe that follows to answer the questions.

Sobia Ingredients:

- 100 g raw short grain rice
- 500 mL of water
- 750 mL cold milk
- 100 g caster sugar
- 5 mL vanilla
- 500 mL coconut milk

Which ingredients are measured by mass?

Which ingredients are measured by capacity?

What is the total amount of liquid ingredients in the drink in milliliters? In liters?

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Multistep Conversions Solve the problems.

1. A family drank 1 liter 500 milliliters of orange juice at breakfast. If there were 3 liters of orange juice before breakfast, how much orange juice is left?

2. A car was filled with 20 liters 500 milliliters of petrol. At the end of the day, there were 15 liters 250 milliliters left in the tank. How much petrol was used?

3. Doha's fish tank contains 5 liters 245 milliliters of water. If the tank can hold 10 liters of water, how much more water does she need to fill the tank?

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Coral Reef Aquarium

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CONNECT

Math Language Review Work with your Shoulder Partner to fill in the chart with the measurement units for each form of measurement. Use what you remember from previous grades to complete the time column.

Measurement Terms			
Length	Mass	Volume/Capacity	Time

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

PRACTICE

Convert.

1. 10 L + 1,495 mL = ________ L ________ mL
2. 8 L – 2,000 mL = ________ L

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3. 4 L 234 mL = ________________ mL

4. 19 L 324 mL = ________________ mL

Convert and express the answers in milliliters.

5. 23 L 244 mL + 2 L 50 mL = ________________

6. 13 L 200 mL – 3 L 100 mL = ________________

Photo Credit: Thammanoon Khamchalee / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 4

Measurement and Unit Conversions


Quick Code
egm4019

Learning Targets

- I can compare place value relationships and measurement conversions.
- I can use multiplication and division to convert measurements.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.


Water Bottle

**A water bottle holds 1 L 500 mL of water.
You drink 750 mL of the water.
How much water is left?**

Student's answer: 1 L 250 mL

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What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

BUILD

Read the Learning Targets for Lesson 4 and discuss the following questions with your Shoulder Partner.

- What parts of these Learning Targets are you confident with?
- What parts of these Learning Targets are you still working on?

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Chart Connections Review the Metric Measurement Conversion chart that follows with a Shoulder Partner. Consider the following questions:

- What do you notice about this chart?
- How is it similar to a Place Value chart?
- How is it different from a Place Value chart?

Work with a partner to fill in the remainder of the boxes in the Metric Measurement Conversion chart.

Kilo-	Hecto-	Deca-	Unit	Deci-	Centi-	Milli-
1,000 units	*100 units*	*10 units*	*1 unit*	*1/10 unit*	*1/100 unit*	*1/1,000 unit*
Kilometer (km)	Hectometer (hm)	Decameter (dam)	Meter (m)	Decimeter (dm)	Centimeter (cm)	Millimeter (mm)
			Gram			
			Liter			

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Complete the problems with your partner.

1. I have 200 Ones. How many Tens? How many Hundreds?

   Tens: ____________________

   Hundreds: ____________________

2. Something measures 200 centimeters. How many decimeters? How many meters?

   Decimeters: ____________________

   Meters: ____________________

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

More Conversions Convert the measurements and fill in the blanks.

1. 200 centimeters is equivalent to __________ meters and __________ decimeters.

2. 4,000 grams is equivalent to __________ decagrams and __________ hectograms.

3. 2 liters is equivalent to __________ centiliters and __________ milliliters.

Convert using multiplication or division. Write an equation for each problem. An example is shown.

Example:

4 m = 400 cm

Equation: 4 x 100 = 400

4. 6,000 mL = __________ dL

   Equation: ____________________________

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5. 40 g = ________ dag

   Equation: ______________________

6. 70 km = ________ hm

   Equation: ______________________

Create your own conversion and equation.

7. ________ = ________

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

CONNECT

Writing About Math How can understanding place value help me when I convert measurements?

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PRACTICE

Solve each problem. Write an equation to show your work.

1. An ant traveled 8 meters from its nest to forage for food. How far is this in centimeters?

   Equation: ____________________

2. A colony of army ants has been known to consume 2 kilograms of food in a month. How many grams of food are consumed by the colony?

   Equation: ____________________

Photo Credit: Thammanoon Khamchalee / Shutterstock.com

3. Two hundred thousand ants drink 1 liter of water. How many milliliters of water is this?

   Equation: ____________________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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CONCEPT
2

Time and Scaled Measurements

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LESSON 5
What Time Is It?


Quick Code
egm4021

Learning Targets

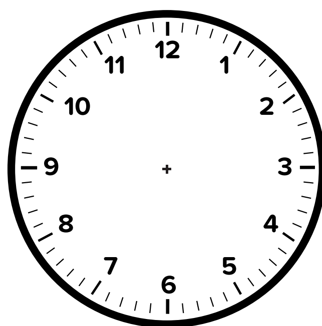
- I can tell time to the minute.
- I can explain relationships between units of time.

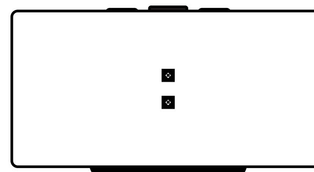
ACCESS

Take out a red and blue crayon to indicate the hour and minute hands.

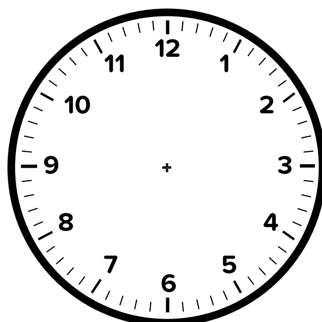
Analog and Digital Clocks Think about three events that happen in your day and the times at which each occurs. Record the event and the time on the analog clock and digital clocks that follow. Use red for the hour hand and blue for the minute hand.

Event 1: ______________________________





Event 2: ______________________________



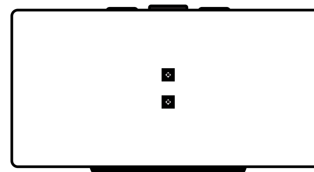
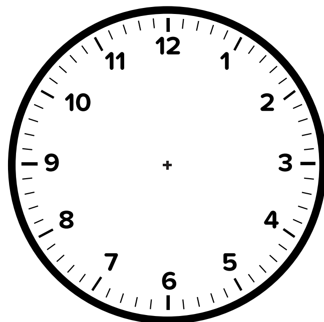


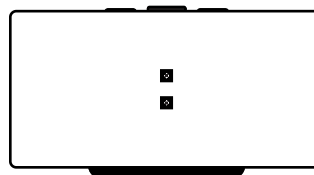
Photo Credit: Elizaveta Galitckaia / Shutterstock.com

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Event 3: ____





BUILD

Brainstorm and name as many units of time as you can. Work with your Shoulder Partner to create a rule for converting units of time.

Ratio Tables Part 1 Work with your teacher and your classmates to fill in Table 1.

Table 1

Minutes	Seconds
1	60
2	
3	
4	
5	
6	
7	
8	
9	
10	

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Work with your teacher to solve the first three conversions for Tables 2, 3, and 4. Discuss rules for converting. Once answers are reviewed, do a Hands up, Pair Up to find a partner to work with to solve the remaining conversion problems in Tables 2, 3, and 4.

Ratio Tables Part 2 Complete Tables 2, 3, and 4.

Table 2

Hours	Minutes
1	60
2	
3	
4	
5	
6	
7	
8	
9	
10	

Table 3

Days	Hours
1	24
2	
3	
4	
5	
6	
7	
8	
9	
10	

Table 4

Weeks	Days
1	7
2	
3	
4	
5	
6	
7	
8	
9	
10	

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

Solve the conversion problems using the ratio tables above.

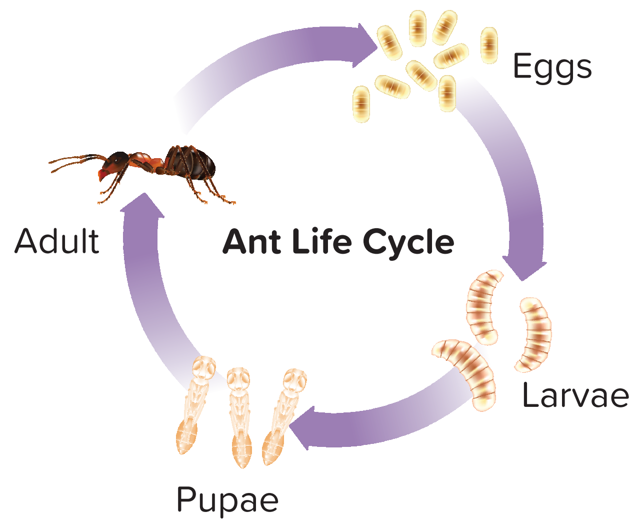
5. 10 hours 30 minutes = __________ minutes

6. 6 minutes 15 seconds = __________ seconds

7. 4 days 20 hours = __________ hours

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Use the life cycle of an ant to answer the questions that follow.



8. Once the queen ant lays eggs, it can take anywhere from 7 to 14 days for them to hatch into the larvae stage. If it takes 10 days for a species of ant eggs to hatch, how many hours would that be?

9. Adult ants feed the larvae liquid and solid food which helps them to grow quickly. Most move into the next stage, pupae, in 6–12 days. If it takes a larvae 6 days and 13 hours, how many total hours will that be?

10. The pupae are white and similar to adult ants with their legs and antennae folded by the body and covered by a white or brown colored cocoon. They emerge as adults somewhere between 9 and 30 days. If it takes the ant 21 days, how many weeks will that be?

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CONNECT

How Hard Do Ants Work? Answer the questions and show your work.

The average worker ant works about 19 hours per day. Worker ants can lift over 100 times their own body weight and they do that hundreds of times every day. They can move pretty quickly at about 3 centimeters per second, so they cover a lot of ground each day. If we were to translate that data to a human adult, that person would have to carry a 22-kilogram weight 60 kilometers every day. Could you do that on only 5 hours of sleep a night?

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Black Ant

1. An average ant works for 19 hours a day. How many hours does an ant work in 3 days?

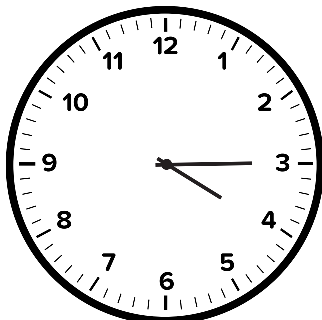
2. A worker ant takes 240 naps a day. Each nap lasts 1 minute. About how many hours did the nap ant?

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PRACTICE

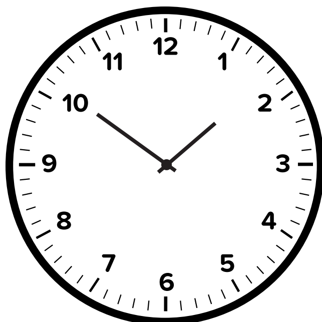
Write the digital time that is shown on each analog clock.

1.



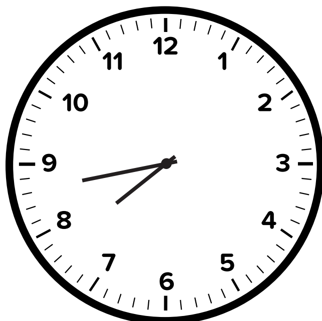
____

2.



____

3.



____

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Fill in the blank.

4. 10 hours 7 minutes = ______________ minutes

5. 5 minutes 12 seconds = ______________ seconds

6. 2 days 12 hours = ______________ hours

7. 4 weeks 2 days = ______________ days

Solve the problem. Show your work.

8. Fill in the blank:

   Amir's family used their computer for 3 hours on Saturday, 4 hours on Sunday, and 5 hours on Monday. How many total minutes were they on the computer?

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

   Challenge: How many seconds?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 6

How Long Does It Take?



Quick Code
egm4022

Learning Targets

- I can explain **elapsed time**.
- I can solve elapsed time problems.
- I can explain the strategies I use to solve elapsed time problems.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

It takes Dalia 2 hours and 15 minutes to drive to her grandmother's house.
How many minutes does the drive take?

Student's work: 2 x 6 = 12   12 + 15 = 27   It took 27 minutes.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

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BUILD

Passage of Time Read the problem in the box silently. How is this problem different from the time problems you solved in the last math lesson? Be prepared to discuss.

> Farah was training for a marathon. Her goal was to run for 1 hour and 30 minutes. If she started running at 8:35 a.m., what time did she finish running?

After sharing your thinking with the class, work with a partner to solve the story problem.

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

Solving Elapsed Time Problems Solve the problems and write the new time. Based on the examples shown to you by your teacher, try a few different strategies to solve the problems. Show your work.

1. 3:25 + 1:26 = __________
2. 3:25 + 45 minutes = __________
3. 5:43 – 1:25 minutes = __________
4. Jana and Maha have 5 hours to watch three movies that last 1 hour and 22 minutes; 2 hours and 12 minutes; and 1 hour and 57 minutes.

   Do the girls have enough time to watch all three movies? How do you know?

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The girls decide to just watch the two shortest movies. If they start watching them at 5:30 p.m., what time will their movies end?

5. A worker ant went out to find food for the colony. It left at 6:30 a.m. and returned at 7:42 a.m. How long was that ant looking for food?

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

CONNECT

Origins of Telling Time Read the following article about why time is measured in groups of 12 and 60. Be prepared to share your thoughts about what you read.

Origins of Telling Time

Ancient civilizations used the sun, moon, and stars in the skies to guide their lives and to measure time.

- A year is how long it takes Earth to rotate around the sun.
- A month is about as long as it takes for the moon to orbit Earth.
- A week is the time between the phases of the moon.
- A day is how long it takes for Earth to rotate on its axis.

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However, why are there 12 hours in the morning and 12 hours in the afternoon and 60 minutes in an hour and 60 seconds in a minute? Why not use a Base 10 system?

The answer lies in those ancient civilizations. The Sumerians used a system of 12 and 60 starting in 3,500 B.C. However, why Base 12 and Base 60? The reason actually comes from the structure of our fingers.

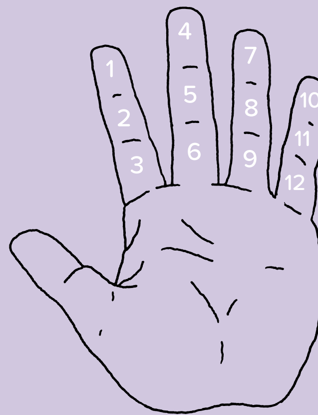


Photo Credit: Elizaveta Galitckaia / Shutterstock.com

The number of joints on each hand, minus the thumb, makes it possible to count to 12 by using the thumb.

The division of an hour into 60 minutes and 60 seconds was determined by astronomers using the Base 60 system of the Babylonians. So our units of time, which can seem so confusing, are linked to the first civilizations and our own hands.

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PRACTICE

Solve. Show your work.

1. 3:45 + 25 min = ________

2. 2:45 + 6:17 = ________

3. 3:07 – 42 min = ________

4. 5:07 – 2:13 = ________

5. An ant's first nap of the day began at 7:45 a.m. and lasted for 60 seconds. What time did the ant wake up?

6. The ant then worked in the colony for 3 hours and 13 minutes before its next nap. What time did the ant take his second nap?

Photo Credit: Elizaveta Galitckaia / Shutterstock.com



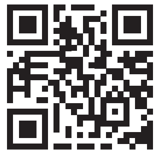
Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 7

Scaled Measurements



Quick Code
egm4023

Learning Targets

- I can create a **line plot** based on given data.
- I can select an appropriate key and **scale** for my line plot.
- I can write questions that can be answered by my line plot.

ACCESS

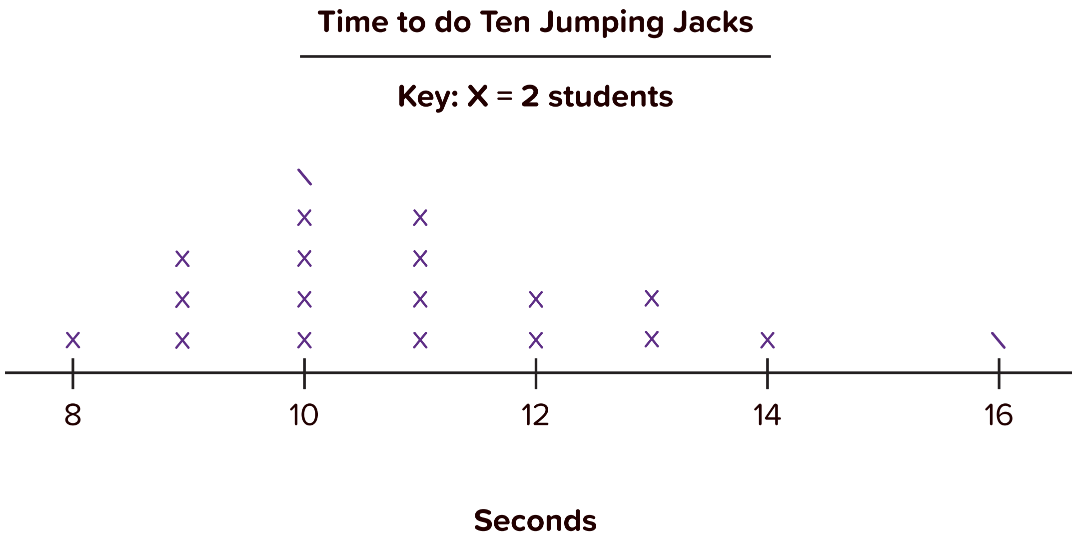
Fun with Facts Match the Fact Family with the number that belongs in the blank.

1. 6, 48, ________ a. 45
2. 8, 72, ________ b. 11
3. 9, 5, ________ c. 8
4. 44, 4, ________ d. 9

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

BUILD

Line Plots Look at the line plot and be prepared to answer the following questions.



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1. What does this line plot show?

2. What does each X represent?

3. How many students are represented?

4. What is the scale for this number line?

Length of Ants Look at the table, which lists the length of a variety of ants around the world. Use it to answer the following questions.

Ant Type	Length (in mm)	Ant Type	Length (in mm)
Ghost ant	1	Red harvester ant	6
Thief ant	2	Siafu ant	7
Pharaoh ant	2	Carpenter ant	9
Argentine ant	3	Trap jaw ant	9
Fire ant	4	Panda ant	8
Sugar ant	5	Dinosaur ant	10
Crazy ant	3	Leaf cutter ant	10
African ant	10	Flying ant	18
Pavement ant	3	Bullet ant	24
Army ant	3	Cow ant	19
Black garden ant	4	Bull ant	40

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

1. Create a line plot that shows this measurement data. Remember to include a title, key, and use a scaled number line to include all lengths. Then, answer the questions that follow.



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2. Why did you make your key the way you did?

3. Why did you make your scale the way you did?

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

4. Write three questions that could be answered by the data in this line plot.

5. If you added the *Titanomyrma lubei* that could be as large as 99 mm, how would that alter your line plot?

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CONNECT

Scales Everywhere We Look Look at the graduated cylinders and answer the questions.

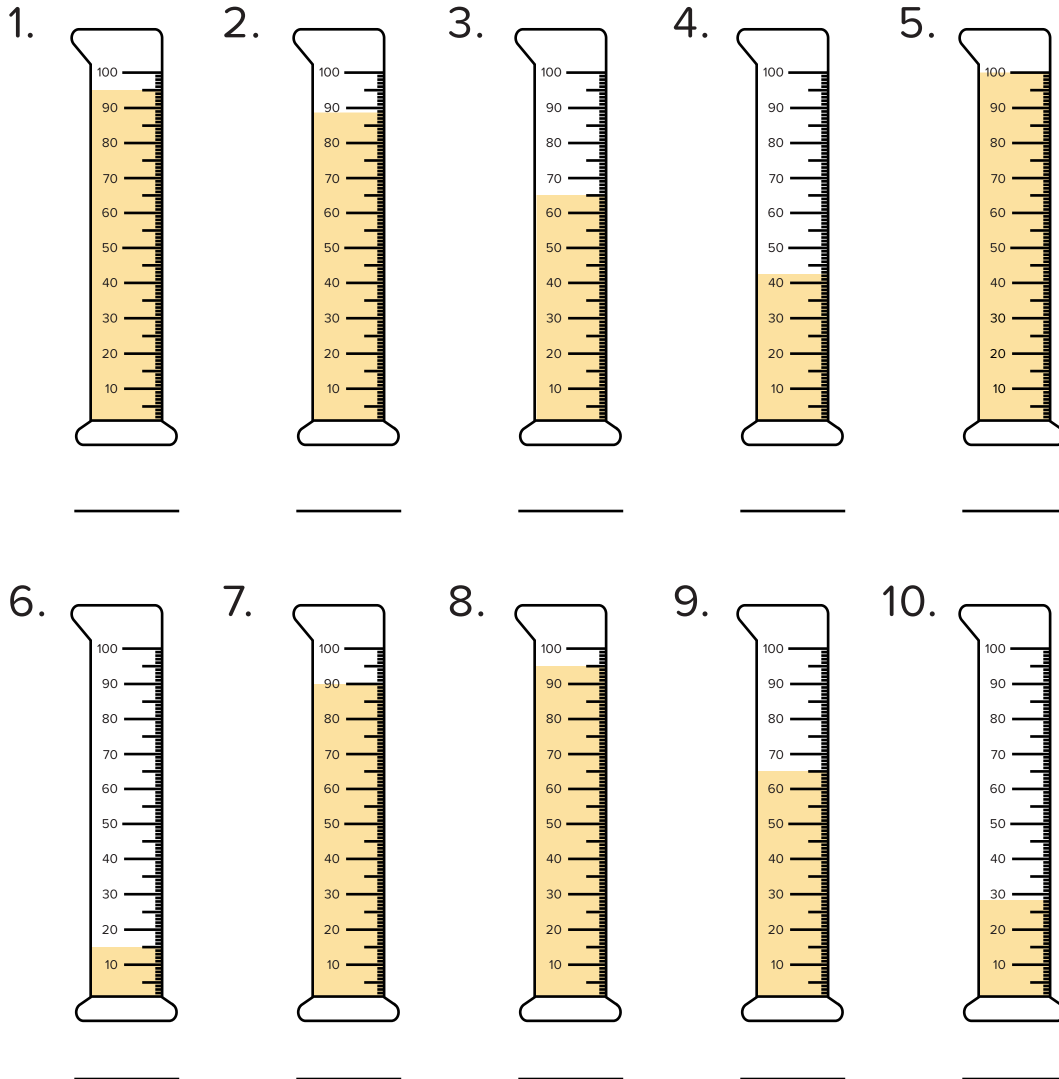


Photo Credit: Elizaveta Galitckaia / Shutterstock.com

1. What title would you use to represent this data?

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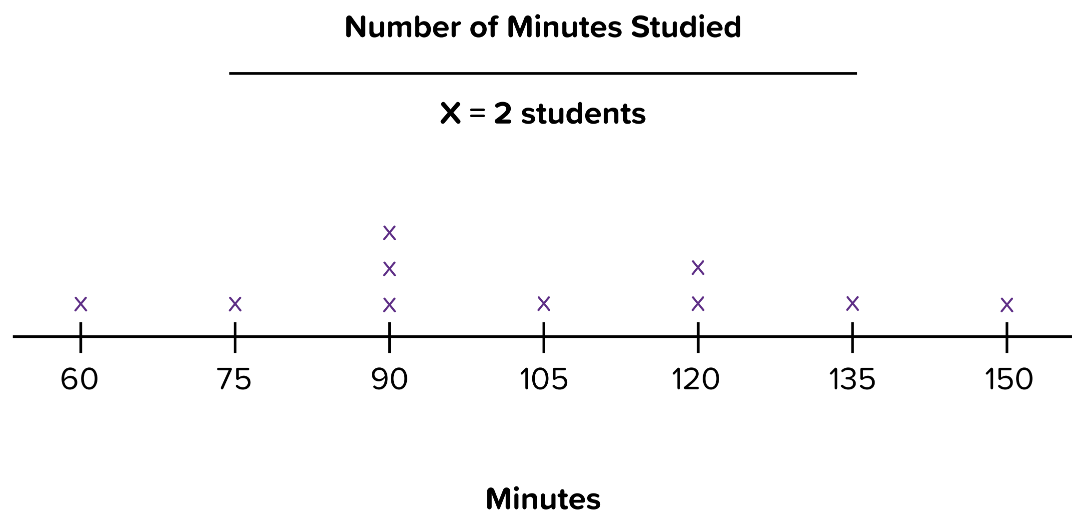
2. What key would you use to represent this data?

3. What scale would you use to represent this data?

Photo Credit: Elizaveta Galitckaia / Shutterstock.com

PRACTICE

Use the following line plot to answer the following questions.



1. What is being measured?

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2. What is the scale for the number line?

For Problems 3–5, record your answer in total minutes and then convert your answer to hours and minutes.

3. What was the least amount of time spent studying?

4. What was the most amount of time spent studying?

5. What was the most common amount of time spent studying?

Photo Credit: Elizaveta Galitckaia / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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Photo Credit: Elizaveta Galitckaia / Shutterstock.com

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CONCEPT 3

Measurement All Around

Photo Credit: Witsawat.S / Shutterstock.com

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LESSON 8

Measuring the World around Me Part 1


Quick Code
egm4025

Learning Targets

- I can add and subtract to solve measurement problems.
- I can solve story problems involving measurement.
- I can apply a variety of strategies to solve story problems.

ACCESS

Take Steps to Solve Problems Use the Steps for Solving Story Problems to solve the problem.

In Colony A, the ants collect 950 grams of food. If they consume 25 grams of food on Monday and 37 grams of food on Tuesday, how many grams of food are left?

Photo Credit: Witsawat.S / Shutterstock.com

BUILD

So Many Strategies Record your favorite and least favorite problem-solving strategy.

The problem-solving strategy that works best for me is

____

because ______________________________________.

The problem-solving strategy I use the least is

____

because ______________________________________.

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Bag of Groceries

Solve as many problems as you can. Use at least three different problem-solving strategies (you may not finish them all, so choose the ones you want to try first). Use the Steps for Solving Story Problems, if that is helpful. Be sure to label your answers.

1. The potatoes Aya bought weighed 2 kilograms 920 grams. Her onions weighed 1,075 grams less than the potatoes. How much did the potatoes and onions weigh together?

2. A pharaoh ant grows from egg to adult in 45 days. A carpenter ant grows from egg to adult in 12 weeks. Which species takes longer to grow from egg to adult? How much longer?

3. A fish tank with a capacity of 100 liters is filled with 20,000 milliliters of water. How many more liters of water are needed to fill it up completely?

4. Zeina purchased 8 kilograms of sugar, 10 kilograms of flour, 500 grams of cocoa, 225 grams of pecans, and 275 grams of coconut. What is the total mass of her groceries in kilograms?

Photo Credit: (a) Witsawat.S / Shutterstock.com, (b) Oksana Mizina / Shutterstock.com

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5. Taher grew 10 centimeters in 1 year. He is now 1 meter 6 centimeters tall. How many centimeters tall was Taher 1 year ago?

6. An ant from Colony A walked 2 kilometers in a day. An ant from Colony B walked 3,000 meters in a day. Which ant walked the farthest and how much farther in kilometers did it walk?

Photo Credit: (a) Witsawat.S / Shutterstock.com, (b) Fercast / Shutterstock.com



Cat Playing in Grass

7. Ali's cat weighs 7 kilograms and his dog weighs 17 kilograms. When Ali took them to the vet, he learned that his cat gained 450 grams and his dog gained 120 grams. How much do his two pets weigh in all now?

8. Mr. Emad bought four 2-liter bottles of soda for the Primary 4 picnic. If there were 2 liters and 829 milliliters of soda remaining at the end of the party, how many milliliters of soda did the students drink?

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9. Worker ants take power naps totaling up to 250 minutes a day. A queen ant may sleep up to 9 hours a day. Which ant sleeps longer and by how many minutes?

10. Rania is measuring two ant lines. Colony A's ant line is 30 centimeters long, and Colony B's ant line is 500 millimeters long. How many centimeters long are the two ant lines together?

CONNECT

Writing About Math Choose one of the BUILD problems. Explain how you solved the problem, why you chose the strategy you used, and how you know your answer is correct.

Photo Credit: Witsawat.S / Shutterstock.com

PRACTICE

Solve using any strategy:

1. Dalia's dog weighs 15 kilograms. When she took her to the vet, she learned that her dog gained 2,000 grams. How many more grams will Dalia's dog need to gain before she weighs 20 kilograms?

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2. Mrs. Basma bought 2 cartons of milk which are 2 liters each. Her three children finished 1,200 milliliters on Monday and 950 milliliters on Tuesday. How many milliliters of milk are left?

Photo Credit: Witsawat.S / Shutterstock.com

3. Ziad played his video game from 3:45 p.m. until 5:10 p.m. He is only allowed to play video games for 80 minutes. Has he broken the rule? If no, why not? If yes, by how many minutes?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 9

Measuring the World around Me Part 2


Quick Code
egm4026

Learning Targets

- I can multiply and divide to solve measurement problems.
- I can solve story problems involving measurement.
- I can apply a variety of strategies to solve story problems.

ACCESS

Ant Math Solve the problem and explain your solution with words, numbers, a drawing, or a table.

An ant is at the bottom of a 20-meter deep well and is trying to get to the top. Each day he climbs 4 meters up, but each night he slides back 2 meters. How many days does it take for him to get out of the well?

BUILD

Multistep Measurement Work with a partner to solve the problem using the "Draw a picture or model" strategy. Be prepared to discuss your thinking.


Chopped Wood

Photo Credit: (a) Witsawat.S / Shutterstock.com, (b) Krasula / Shutterstock.com

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Ahmed has a 12-meter-long piece of wood. He wants to cut it into 3 equal lengths. How long should each cut piece be in meters? How long will each of these pieces be in centimeters?

Jigsaw Work with your Home Team small group to solve the problem assigned to you by your teacher. Be ready to share your strategy with others.

Circle your assigned team number. 1 2 3 4

1. Ayman is a runner. While Ayman is in training, he needs to drink 500 milliliters of water 4 times per day. How many liters of water will that be for 1 week?

Photo Credit: Witsawat.S / Shutterstock.com

2. Ehab is a weightlifter. He has a mass of 100 kilograms. His aim is to gain 500 grams per week. If he does that for 5 weeks, what will his mass be at the end?

3. Amany is a swimmer. She spends half an hour every day swimming. How many minutes in total does she swim for during a 5-day period?

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4. Sara travelled 9 days continuously. She travelled 5,000 meters each day. How many kilometers did she walk in all?

When directed by your teacher, travel to your Share Team and share your solution and strategy. Listen to the other members of your Share Team and record the solutions and strategies for the other problems above.

CONNECT

Ants Are Amazing Read the information about ants. Then, solve the problem. Show your work.



Ants Marching

Photo Credit: (a) Witsawat.S / Shutterstock.com, (b) Mrs.Narawan Artayakul / Shutterstock.com

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Ants Are Amazing

Ants are one of nature's biggest scavengers. The majority of ants are opportunistic and will eat meat. This includes insects and dead things. Most ants are carnivorous, but there are some species which feed exclusively on plants. For example, leaf cutter ants are almost exclusively herbivores (animals that only eat plants).

Almost all species of ants will work together to bring food to the colony. Worker ants, or scouts, will leave their nest (colony) in search of food. They use their antennae or other senses to find a suitable food source. Then, they secrete pheromones (chemicals) as a trail for the rest of the colony to follow to get the food. This can be a very long, slow process for the ants.

Ants have an impressive ability to lift objects much heavier than their own body weight. According to different estimates, ants can carry 10 to 50 times their body weight, and maybe even more.

Photo Credit: Witsawat.S / Shutterstock.com

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View the video shown to you by your teacher. Solve the problem that follows.

1. Mariam was having a picnic with her family and counted 10 ants walking by. If each ant weighed 1 gram and carried 50 times its body weight, how much weight was being carried in all?

Photo Credit: Witsawat.S / Shutterstock.com

PRACTICE

Solve using any strategy.

1. Ants walk about 5,000 meters each day. How many kilometers do ants walk in 6 days?

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2. Samira is studying for an upcoming math test. If she studies for 30 minutes a day, how many hours will she have spent studying in 8 days?

3. A colony of ants eats approximately 2,000 grams of food each day. If the ants have 10 kilograms of food stored, how many days will the food last?

Photo Credit: Witsawat.S / Shutterstock.com

4. An ant may walk up to 5 km per day. If the ant continues this for 20 days, how many meters will the ant walk?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT

4

Theme 1 | Number Sense and Operations

Unit 4

Area and Perimeter

Photo Credit: Irzhanova Asel / Shutterstock.com





Hungry Ants

Unit Video Questions



Quick Code
egm4083

Omar and Mariam are observing a group of worker ants in the park. When ants leave the colony, they can travel long distances. To study the ants, Omar and Mariam decide to only observe the ants while they are in a certain space. They may need some help creating boundaries for this space.

- ☐ What shape should Omar and Mariam make their observation space?
- ☐ Why do worker ants travel long distances away from their colony?
- ☐ Can the ants be contained in the space Omar and Mariam create?

Photo Credit: (a) Irzhanova Asel / Shutterstock.com, (b) Volodymyr Burdiak / Shutterstock.com

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CONCEPT
1

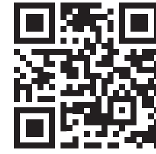
Explore Area and Perimeter

Photo Credit: frank60 / Shutterstock.com

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LESSON 1

Marching Ants

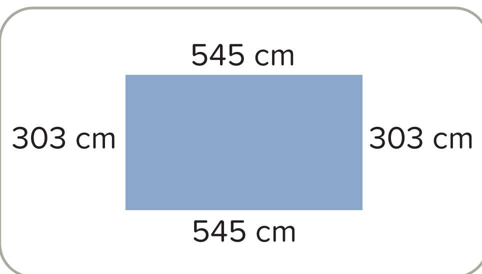

Quick Code
egm4085

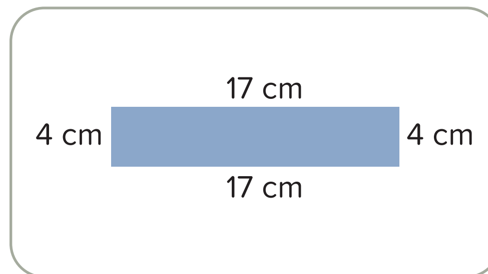
Learning Targets

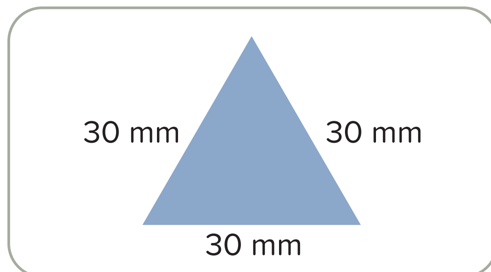
- I can define **perimeter**.
- I can use **formulas** to calculate the perimeter of rectangles.
- I can explain how to calculate perimeter.

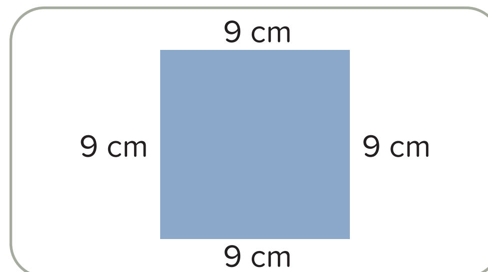
ACCESS

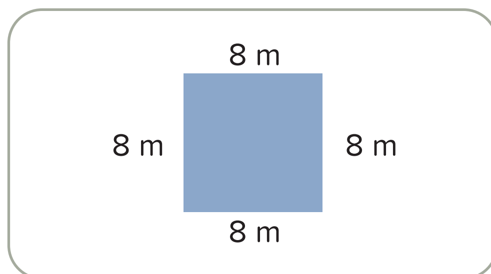
Rectangle Review Compare the shapes in the boxes. Highlight or circle all of the rectangles and place a star on the squares.

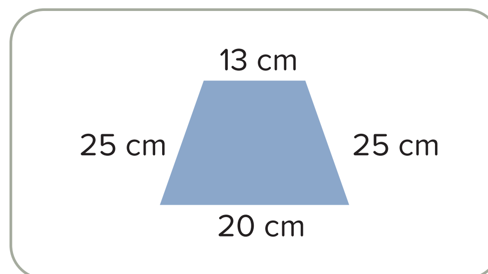












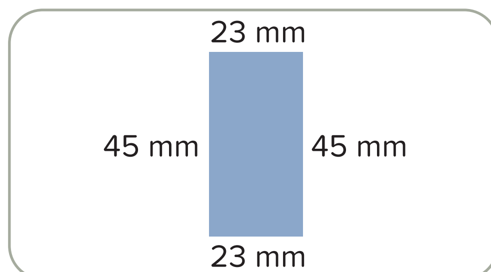


Photo Credit: frank60 / Shutterstock.com

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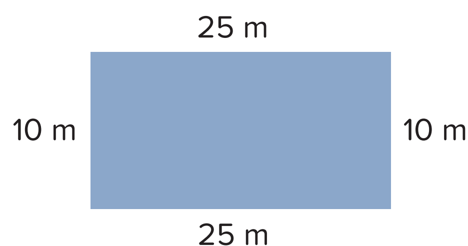
BUILD

Marching Ant Addition Solve the problems. Show your work.

1. A group of worker ants are in search of food. They secrete pheromones (chemicals) to lay a scent trail. They follow each other in a line around a building. Using the model that follows, what is the perimeter of the building?



Ant Carrying Food



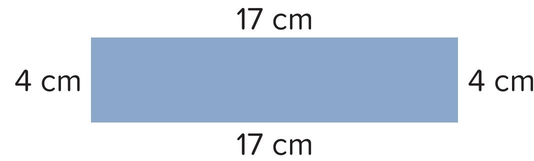
2. Work with your partner to write a rule or formula to help mathematicians efficiently solve perimeter problems.

Photo Credit: (a) frank60 / Shutterstock.com, (b) Rapin_1981 / Shutterstock.com

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3. Use the $P = l + w + l + w$ formula to calculate the perimeter of the shapes. Show your work.



4. Use the $P = l + w + l + w$ formula to calculate the perimeter of the shapes. Show your work.

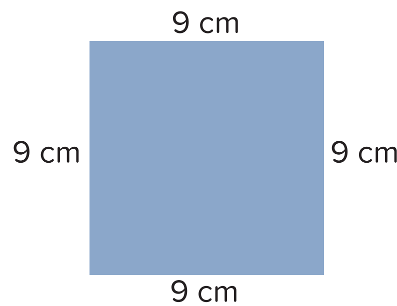
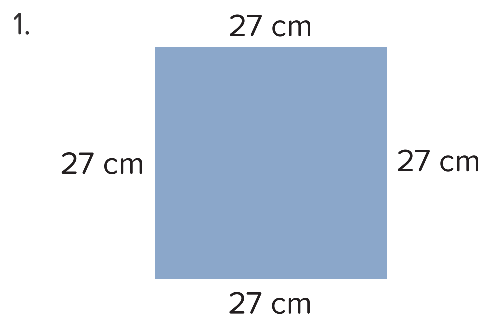


Photo Credit: frank60 / Shutterstock.com

Foraging for Formulas Calculate the perimeter of the shapes that follow. Use two different formulas to solve each problem. Show your work.

1.



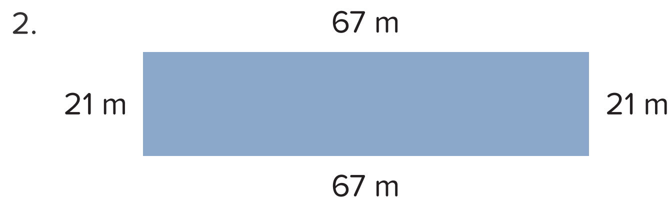
Formula 1: ______________________

Formula 2: ______________________

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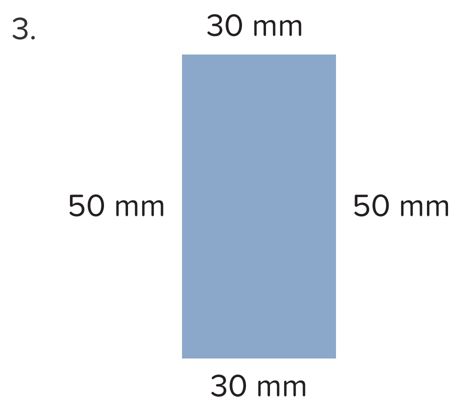
2.



Formula 1: ______________________________

Formula 2: ______________________________

3.



Formula 1: ______________________________

Formula 2: ______________________________

Solve the following perimeter problems. For each problem, sketch a rectangle and record the length and width according to the problem.

4. Sarah is putting a border around the edge of a square cake. One side of the cake is 30 centimeters long. How long will the border of Sarah's cake be?

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5. A soccer team is roping off part of a field to play soccer. To have enough room for a large crowd, they need a space that is 105 meters long by 68 meters wide. How much rope will they need for this part of the field?

CONNECT

Carpenter March Solve the perimeter problem. Show your work.

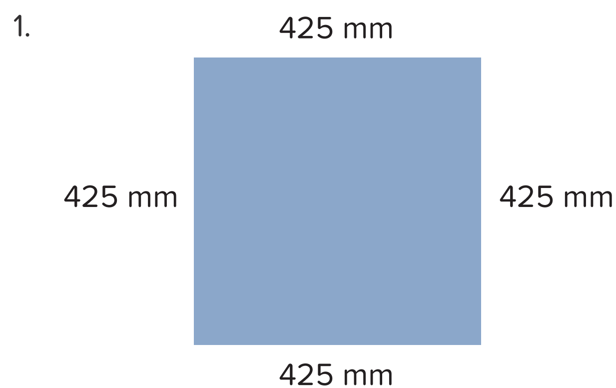
A carpenter ant walked a perimeter of 100 centimeters. Draw two different rectangles that could represent its walk.

Photo Credit: frank60 / Shutterstock.com

PRACTICE

Find the perimeter. Show your work.

1.



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2. 57 m



13 m

Find the perimeter. Show your work.

3. Sherif is building a square picture frame. Each side will be 36 millimeters long. What will the perimeter of the frame be?

4. Omar is building a rectangular fence around his garden. The length is 8 meters and the width is 6 meters. How many meters of fencing will he need to build?

Photo Credit: frank60 / Shutterstock.com



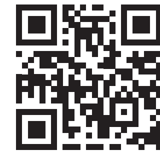
Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2
Fill the Space


Quick Code
egm4086

Learning Targets

- I can define **area**.
- I can use formulas to calculate the area of rectangles.
- I can explain how to calculate area.

ACCESS

Number Talk Describe the strategy (or strategies) you used to solve the addition problems mentally.

BUILD

Area Review Determine the area of the rectangles. Show your work.

1.

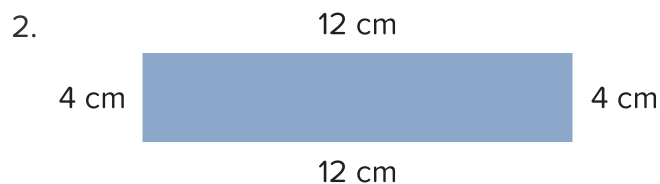
Area = ______________________

Photo Credit: frank60 / Shutterstock.com

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2.



Area = ___________________________

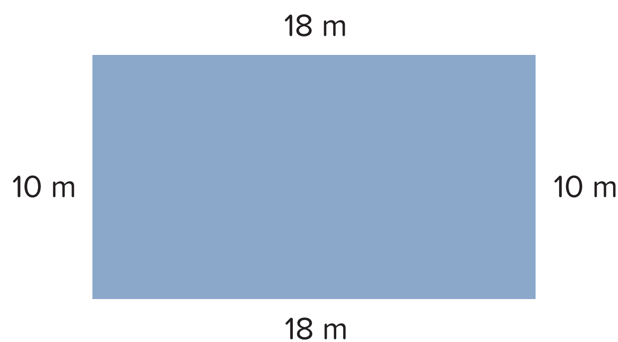
3. Create a formula for finding the area of a rectangle.

4. Could you use your formula to find the area of a square? Sketch a square and show your thinking.

Photo Credit: frank60 / Shutterstock.com

Area Practice Solve the problems. Show your work and label your answers.

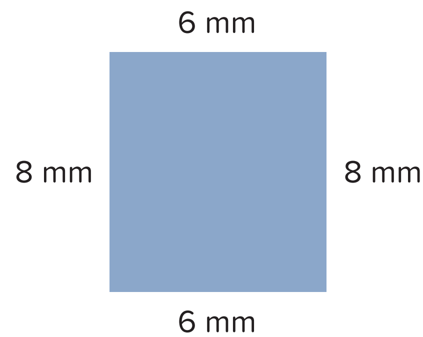
1. Find the area.



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2. Find the area.



3. A glass company is cutting a piece of glass to cover the top of a banquet table. The table measures 8 meters by 6 meters. What is the area of the glass needed for the table?


Cutting Glass

4. A small rectangular ant farm measures 20 centimeters by 8 centimeters. What is the area of the ant farm?

Photo Credit: (a) frank60 / Shutterstock.com, (b) Andrzej Rostek / Shutterstock.com

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5. **Challenge:** Ganat wants to create a long piece of artwork and needs two sheets of paper to do it. Each piece of paper is 6 meters long and 2 meters wide and will be connected so two short edges touch. When she finishes the art, she has to decide whether to frame it or to hang it and cover it with glass. Ganat needs to know the measurements of the frame and the glass to make her decision.

   What is the measurement of the frame? Should you calculate area or perimeter to find that measurement?

   What is the measurement of the glass? Should you calculate area or perimeter to find that measurement?

CONNECT

Carpet Tile Solve the problem. Show your work.

You have 36 square carpet tiles to arrange on the floor in the shape of a rectangle. Draw two possible arrangements and label the length and width. What is the perimeter of each arrangement? What is the area?

Photo Credit: frank60 / Shutterstock.com

PRACTICE

For each problem, find the area and perimeter. Show your work and label your answers.

1. For a science project, two students are creating an ant farm enclosure. Their enclosure will be 5 meters long and 2 meters wide. Sketch the enclosure and label the dimensions. Then, find the perimeter and area.

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2. The area of a rectangular bakery is 30 square meters. What could the perimeter be? Sketch your answer and label the dimensions.

Find the area and perimeter of the rectangles. Show your work and label your answers.

1.

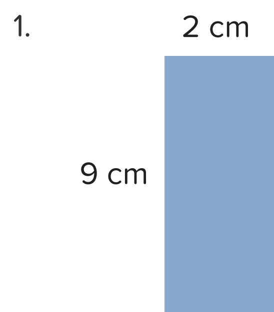
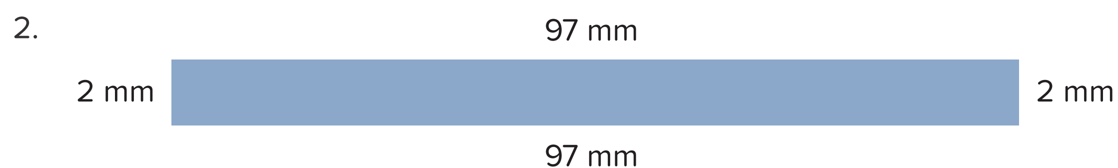


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2.





Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3

Something Is Missing!



Quick Code
egm4087

Learning Target

- I can use formulas to calculate **unknowns** when given some **dimensions** of rectangles.

ACCESS

Error Analysis Read the facts about fire ants. Analyze the student's work and answer that follow. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Fire Ant Facts

- Fire ants like warm climates.
- Fire ants build soil mounds ranging from small bumps to 46 centimeters in height. These mounds do not have an opening on the top like regular anthills.



Fire Ant Mound

Photo Credit: (a) frank60 / Shutterstock.com, (b) Robert Gregory Griffeth / Shutterstock.com

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- Workers create underground tunnels that can extend up to 8 meters away from the mound.
- Fire ants were brought to other countries on boats from South America and have spread.
- Fire ants live in colonies that can contain more than 200,000 ants.
- Fire ant colonies typically have just female worker ants and one queen. The queen is responsible for laying eggs.
- Fire ants feed on a wide range of foods including insects, plant nectar, seeds, fruits, and dead animals. They are highly attracted to foods high in fat.
- It can take several months for a colony to grow a mound that is large enough to be visible.

Photo Credit: frank60 / Shutterstock.com

Problem: Amir is a myrmecologist who found a large fire ant mound. He placed string around the outside of the mound in a rectangular shape so that he could study the mound safely. The width of the rectangle was 8 meters and the length of the rectangle was 12 meters. How many square meters are roped off to study?

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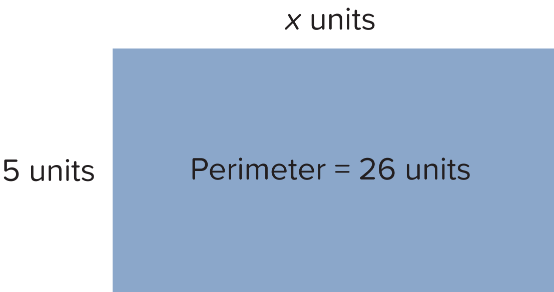
Student's Solution:
There are 40 meters of ground to study. 8 + 8 + 12 + 12 = 40.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly and explain your thinking.

Photo Credit: frank60 / Shutterstock.com

BUILD

Mystery Dimension Work with a partner to answer the questions about the rectangles.



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1. What is known about this rectangle?

2. What is unknown about this rectangle?

3. How can we use the perimeter to help find the missing dimension? What is the missing dimension?

4. What is known about this rectangle?

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5. What is unknown about this rectangle?

6. How can we use the area to help find the missing dimension? What is the missing dimension?

SCOOT Your task is to solve as many perimeter and area problems as you can with your partner. Show your work in the box that matches the card number. When you finish a card, solve another one.

SCOOT Recording Sheet

1	2	3	4
5	6	7	8
9	10	11	12

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CONNECT

Compound Shape Challenge Read the problem and solve to find the perimeter. Then, take the challenge and find the area.

Some fire ants left the mound to go look for food. They went 8 meters east from the mound and then turned and walked 4 meters north. They came to a big tree so they walked around it. When they passed the tree, they turned west for 3 more meters and then headed south 8 meters back home. See their path in the diagram. Label the missing measurements. How many meters in total did they walk? What is the area of the shape?

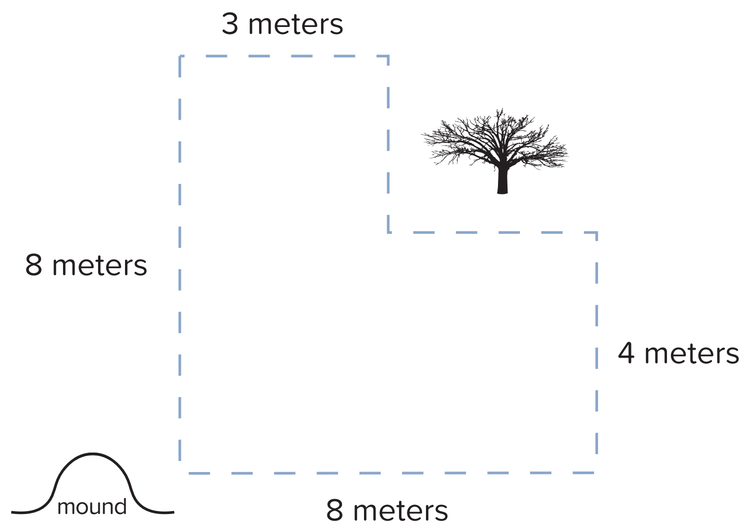


Photo Credit: frank60 / Shutterstock.com

Perimeter = ______________________

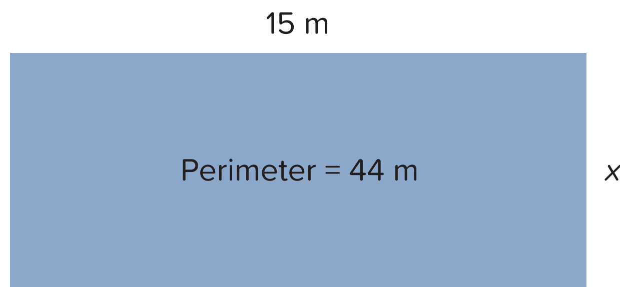
Area = ______________________

P4_Math_T1_U4_SE.indd Page 177 26/06/21 1:38 PM f-0311 /130/DIS00002/work/indd/SE/Unit_4

PRACTICE

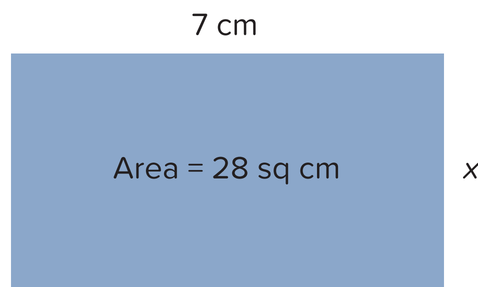
Solve the problems. Show your work and label your answers.

1. Find the unknown side length based on the perimeter given.



x = ______________________

2. Find the unknown side length based on the area given.

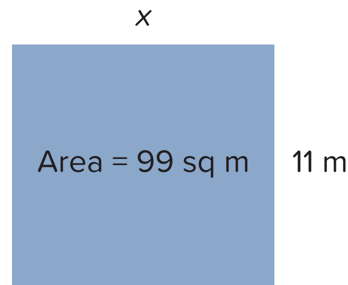


x = ______________________

Photo Credit: frank60 / Shutterstock.com

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3. Find the unknown side length based on the area given.



x = ____________________

4. Tahani is building a square picture frame for her father. The picture she has to frame has an area of 144 square centimeters. What is the width and the length of her frame? Sketch the frame and show your work.

Photo Credit: frank60 / Shutterstock.com

5. Soliman works on a farm. The fence for the goats fell down, and his uncle asked Soliman to get more wire to make a new fence. He was told that the width of the fence is 25 meters and that he needs to get 110 meters of wire to go around the entire space. What is the length of the missing side? Sketch the fence and find the missing length.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 4
Odd Shapes


Quick Code
egm4088

Learning Targets

- I can find the area and perimeter of **complex** shapes.
- I can explain my strategy for finding the area and perimeter of complex shapes.

ACCESS



Making Crazy Shapes

Follow your teacher's instructions.

1. Calculate the perimeter and area of the shape your teacher gave you. Record your calculations. Then, at your teacher's direction, cut out your shape along its perimeter.

   Shape ______________________

   Perimeter = ______________________

   Area = ______________________

2. Work with your partner to create a new shape. Make sure that two sides touch. Trace the new shape.

   New Shape:

3. Talk with your partner about how you would find the new shape's area and perimeter. Record your thinking. (Do not find it yet. Just come up with a strategy.)

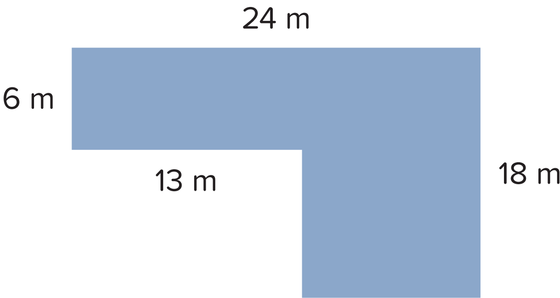
Photo Credit: frank60 / Shutterstock.com

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BUILD

Calculating Crazy Shapes Solve each problem.

1. Divide this shape into smaller rectangles or squares. Then, calculate its area and perimeter. Show your work.



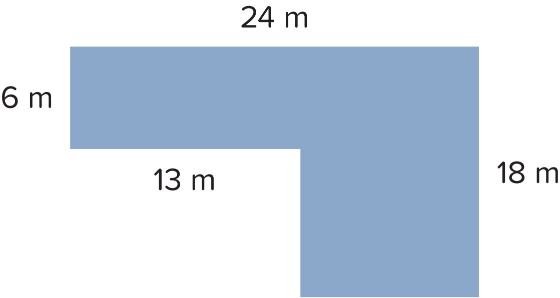
Area = ______________________

____

____

Perimeter = ______________________

2. Divide the shape in a different way and calculate its area and perimeter. Show your work.



Area = ______________________

Perimeter = ______________________

3. What do you notice?

____

____

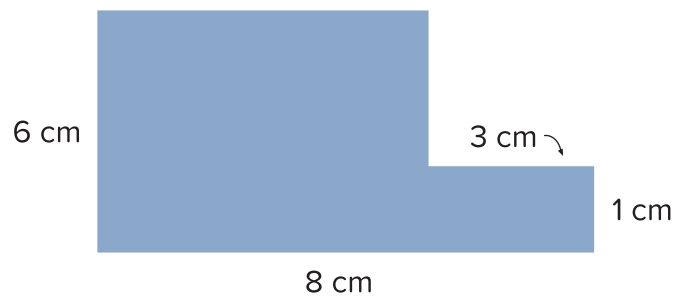
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Photo Credit: frank60 / Shutterstock.com

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Calculate the area and perimeter of the complex shapes. Show your work.

4.



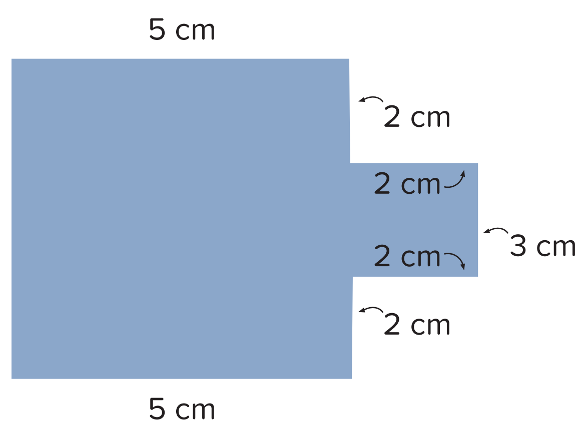
Area = ______________________________

____

____

Perimeter = ______________________________

5.



Area = ______________________________

____

____

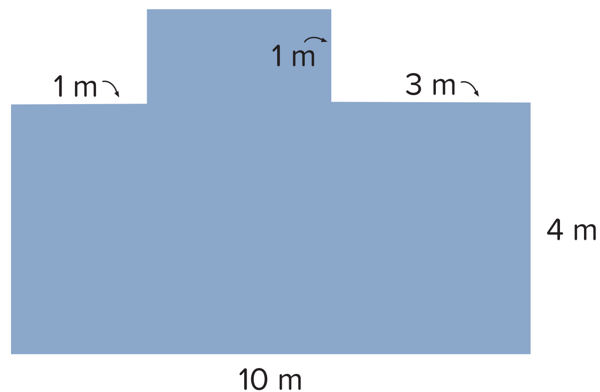
Perimeter = ______________________________

____

Photo Credit: frank60 / Shutterstock.com

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6.



Area = ______________________________

____

____

Perimeter = ______________________________

7. Calculate the area and perimeter of the complex shape you created in ACCESS.

Area = ______________________________

Perimeter = ______________________________

Challenge: Design your own complex shape and calculate its area and perimeter.

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CONNECT

Writing About Math Read and solve the problem.

What do you think is the easiest part of calculating the area and perimeter of complex shapes? What do you think is the most challenging part of calculating the area and perimeter of complex shapes?

PRACTICE

Solve the area and perimeter problems. Show your work.

1. Combine these two simple shapes into a complex shape. Sketch your shape, labeling the sides. Then, calculate the area and perimeter of the complex shape.

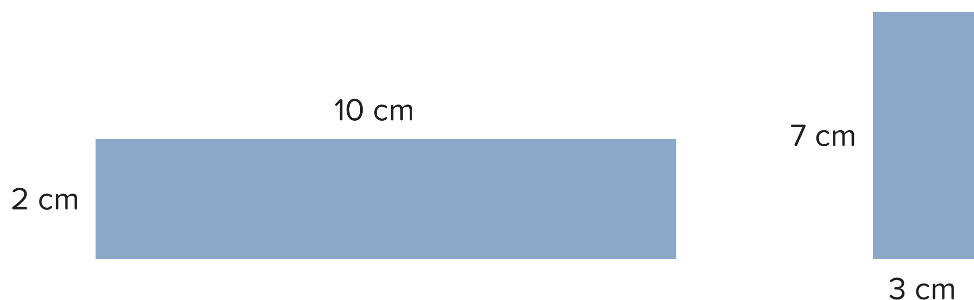
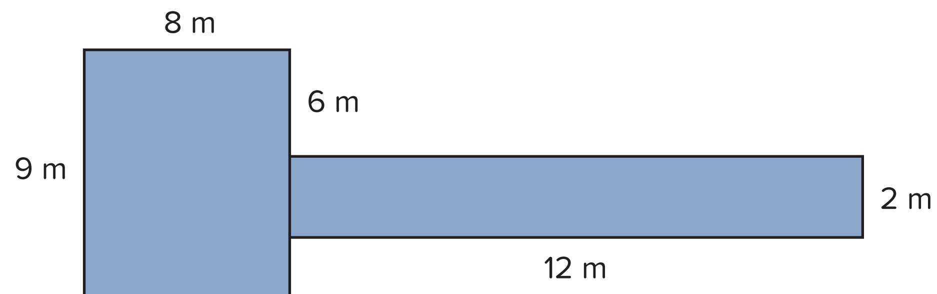


Photo Credit: frank60 / Shutterstock.com

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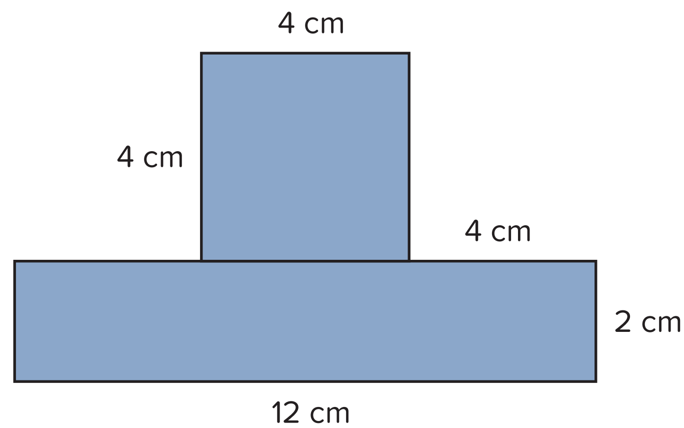
2. Calculate the area and perimeter.



Area = ______________________

Perimeter = ______________________

3. Calculate the area and perimeter.



Area = ______________________

Perimeter = ______________________

Photo Credit: frank60 / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 5
Growing Dimensions


Quick Code
egm4089

Learning Target

- I can use area and perimeter formulas to solve **multiplicative comparison** problems.

ACCESS

Big Ants, Small Ants Talk to your partner about what you notice about the different lengths of the various ant species and how they compare to one another. Write one multiplicative comparison statement using a comparison phrase like "*n* times as long as" or "*n* times smaller than." Be ready to share your thinking with the class.

Ant Species	Lengths
Ghost ant	1 mm
Pharaoh ant	2 mm
Argentine ant	3 mm
Fire ant	6 mm
Sugar ant	15 mm

Multiplicative Comparison Statement:

____

____

____

____

Photo Credit: frank60 / Shutterstock.com

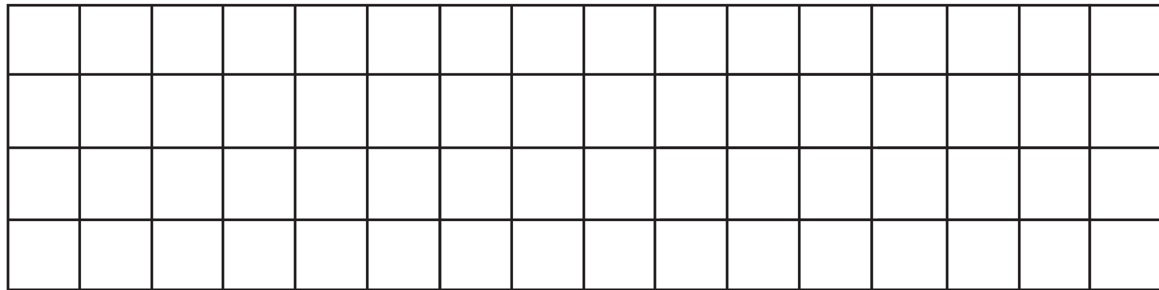
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BUILD

Draw and Solve Answer the problems.

1. Draw a rectangle with a width of 1 unit and a length 3 times as long as the width.

2. What would the length of a new rectangle be if its length were 2 times as long as your first rectangle? Draw the new rectangle on the grid. Then calculate its area and perimeter.



Area = ______________________

Perimeter = ______________________

3. What would the new length be if the rectangle were 3 times as long as the first rectangle?

____

4. What equation can you use to find the new length?

____

5. Draw the new rectangle on the grid and find its area and perimeter.

Area = ______________________

Perimeter = ______________________

Photo Credit: frank60 / Shutterstock.com

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6. A rectangle is 5 centimeters wide. It is 4 times as long as it is wide. Draw the rectangle, label the dimensions, and find its area and perimeter.

Area = ______________________________

Perimeter = ______________________________

Picnic at the Park Read the question and complete the table with a partner.


Picnic Blanket

Photo Credit: (a) frank60 / Shutterstock.com, (b) ll.studio / Shutterstock.com

Worker ants from three different colonies are in search of food. They use pheromones to lay a scent trail, and follow each other in a line around picnic blankets.

- Colony A's ants walk around a blanket that is 2 meters wide and has an area of 12 square meters.
- Colony B's blanket is twice as wide as Colony A's blanket (but the same length).
- Colony C's blanket is three times as wide as Colony A's blanket (but the same length).

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Draw and label a picture to represent each blanket. Find the area and perimeter for each blanket.

1. **Colony A's blanket:**

Area = ______________________

Perimeter = ______________________

2. **Colony B's blanket:**

Area = ______________________

Perimeter = ______________________

3. **Colony C's blanket:**

Area = ______________________

Perimeter = ______________________

Photo Credit: frank60 / Shutterstock.com

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CONNECT

Writing About Math Reflect on your work in Picnic at the Park. What conclusion can you make about the areas of two rectangles when the lengths are the same, but the width of one is twice as much as the width of the other?

PRACTICE

Solve the problems. Show your work.

1. Adam's rectangular garden is 20 square meters. The longer side of the garden is 5 meters. Sketch a drawing of Adam's garden. Dalia's garden is three times as long and three times as wide as Adam's rectangular garden. What is the perimeter of Dalia's garden?

2. The area of Mohamed's basketball court at home is 15 square meters. The longer side is 5 meters. Sketch a drawing of Mohamed's basketball court. The basketball court he plays in at the park is two times as long and two times as wide. Find the perimeter and area for both basketball courts.

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3. Rami and Salah went on a camping trip. The diagram of their campsite is shown. If the length of the campsite is six times the length of the tent and the width of the campsite is three times the width of the tent, how much room will they have left to set up the rest of their camping gear?

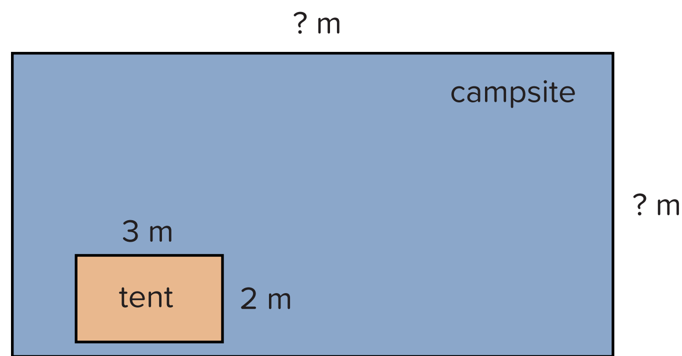


Photo Credit: frank60 / Shutterstock.com

4. Mariam painted a mural for the school with an area of 24 square meters and a length of 8 meters. What is the width of her mural? Her next mural will be the same length as the first but three times as wide. What is the perimeter of her next mural? What is the area?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT

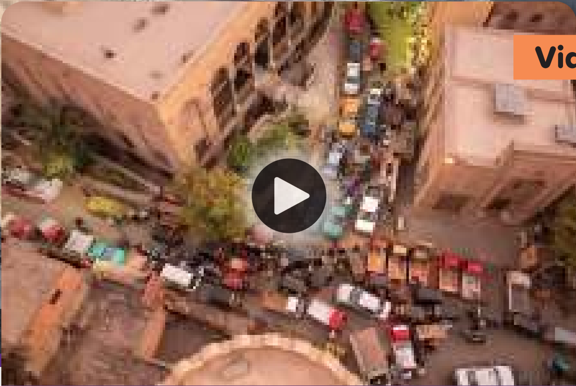
5

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 5 Multiplication as a Relationship



Photo Credit: KHALED EL...



Multiplication Moments

Unit Video Questions



Quick Code
egm4061

The video Multiplication Moments encourages the use of multiplication to calculate the number of people who travel by different modes of transportation. Omar and Mariam are investigating and comparing numbers of people who travel on different types of transportation.

- ☐ How can they use multiplication instead of addition to calculate large quantities?

Photo Credit: (t) KHALED ELFIQI / EPA-EFE / Shutterstock.com, (b) Sandra Pierce / Shutterstock.com

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CONCEPT 1

Multiplicative Comparisons

Photo Credit: ©[illegible] / Shutterstock.com

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LESSON 1
Understanding Multiplicative Comparison


Quick Code
egm4063

Learning Targets

- I can define **multiplicative comparison**.
- I can explain how multiplication can be used to compare numbers.
- I can create models to show multiplicative comparisons.

Photo Credit: (a) Ossamaabdelbary / Shutterstock.com, (b) New Africa / Shutterstock.com

ACCESS


Unfastened Seat Belt Straps

Seat Belt Safety Have you ever wondered how much safer you are in a car when you wear a seat belt? Your teacher will give you a strip of paper. Compare your strip of paper to your teacher's strip of paper. Then estimate:

- How many times could your strip fit on your teacher's strip?
- How many times could you and your partner's strip laid end-to-end fit on your teacher's strip?
- How many times could four or five strips laid end-to-end fit on your teacher's strip?



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BUILD



Visualizing Multiplicative Comparison with Diagrams

Work with your teacher to model comparisons. Cut apart the tapes given to you by your teacher and glue them end-to-end to create tape diagrams. Label each tape. Then, complete the comparison statements.

1. Compare 10 and 2. 10 is ______ times greater than 2.
2. Compare 12 and 3. 12 is ______ times greater than 3.
3. Compare 18 and 6. 18 is ______ times greater than 6.

Photo Credit: Ossamaabdelbany / Shutterstock.com

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Multiplicative Comparison with Numbers Use tape diagrams or multiplication facts to compare the numbers. Be sure to show your work for each problem.

1. Compare 15 and 3. 15 is ______ times greater than 3.
2. Compare 28 and 7. 28 is ______ times greater than 7.
3. Compare 27 and 9. 27 is ______ times greater than 9.

CONNECT



Fastened Seat Belt Straps

Photo Credit: (a) Ossamaabdelbary / Shutterstock.com, (b) karakedi35 / Shutterstock.com

Writing About Math Respond to the questions. Use numbers and words to explain your thinking.

- How do multiplicative comparisons help us understand how much safer it is to wear a seatbelt?
- How can we use multiplicative comparisons to help us understand and describe the world around us?

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PRACTICE

Rewrite each equation using multiplication.

1. 6 + 6 + 6 = 18 ______________________

2. 2 + 2 + 2 + 2 + 2 + 2 + 2 = 14 ______________________

Fill in the blanks to complete the multiplicative comparison statement for each tape diagram.

3.

5	5	5	5

______ is ______ times greater than 5.

4.

8	8	8

______ is ______ times greater than 8.

5.

4	4	4	4

______ is ______ times greater than 4.

Photo Credit: Ossamaabdelbary / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2

Creating Multiplicative Comparison Equations

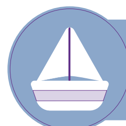

Quick Code
egm4064

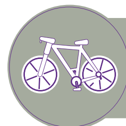
Learning Targets

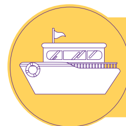
- I can create multiplication equations to represent comparisons.
- I can use a letter to represent a missing number in a multiplication problem.

ACCESS

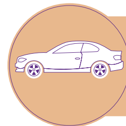
Comparing Transportation Speeds Read the infographic. Highlight or circle phrases that show multiplicative comparison.


A sailboat travels about 2 times faster than a person walking.

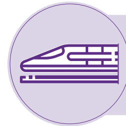


A bicycle travels 3 to 4 times faster than a sailboat.



A cruise ship travels about the same speed as a fast bicycle and about 8 times the speed of a person walking.




A car travels about 20 times faster than a person walking and more than twice as fast as a cruise ship.




High-speed trains move 8 times faster than a cruise ship and over 30 times as fast as a sailboat.



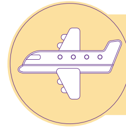

Passenger airplanes travel nearly 200 times faster than a person walking, but more than twice as fast as a high-speed train.



Photo Credit: Ossamaabdelbary / Shutterstock.com

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BUILD

Multiplying to Show Comparisons Write an equation based on the comparison statement. Use a letter to represent the unknown number. You do not have to solve the equations.

1. 4 times greater than 3 is ____________________
2. 18 is 6 times as many as ____________________
3. 2 times greater than 7 is ____________________
4. 24 is 4 times as great as ____________________
5. 25 is 5 times as many as ____________________

Creating Equations for Multiplicative Comparisons Work with a partner to complete this activity. Read the story problems. Think about the comparisons being expressed in the story. Then, write a multiplication equation based on the story problem. Use a letter to represent the unknown number. You do not have to solve the equations.

1. Nadia collected 5 marbles in March. By May she had 4 times as many marbles. How many marbles does Nadia have in May?

   ____

2. Hamed had 12 cookies, which was 3 times as many cookies as his brother, Ahmed. How many cookies did Ahmed have?

   ____

3. It took Aida 21 minutes to walk to school on Monday. On Tuesday, it took her 7 minutes to ride her bike to school. How many times faster was riding her bike than walking?

   ____

Photo Credit: Ossamaabdelbary / Shutterstock.com

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CONNECT

Exit Ticket Imagine a car is 3 times faster than a bicycle. It takes Salma 24 minutes to get to school by bicycle. Write a multiplication equation that shows how long it would take Salma to get to school by car. Use a letter to represent the unknown number. Use words, numbers, or pictures to explain your thinking. You do not have to solve the equation.

Photo Credit: (a) Ossamaabdelbary / Shutterstock.com, (b) Frances L Fruit / Shutterstock.com



Bicycles Parked in a Bike Rack

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PRACTICE

1. Write an equation for the comparisons. Use a letter to represent the unknown number. You do not have to solve the equations.

   a. 7 times as many as 4 is ______________________.

   b. 6 times greater than ______________________ is 48.

   c. 27 is ______________________ times greater than 9.

   d. Menna ran around the soccer field 4 times. Aya ran around the field twice as many times. How many times did Aya run around the field?

   ____

   e. Rana has 6 mangoes. Her brother Sherif has 18. How many times more mangoes does Sherif have?

   ____

Photo Credit: Ossamaabdelbary / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3

Solving Multiplicative Comparison Equations



Quick Code
egm4065

Learning Target

- I can solve a multiplication equation that represents a comparison.

ACCESS

Different Ways of Solving Read the problem and decide whether you agree or disagree with Moustafa.

Moustafa is solving the equation 6 x a = 18. He says that he can solve the problem by doing 18 ÷ 6 = a. Do you agree or disagree with Moustafa? Why? Use words, numbers, and pictures to explain your thinking.

Photo Credit: Ossamaabdelbary / Shutterstock.com

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BUILD


Empty Bus Seats


Motorbike

Photo Credit: (a) Ossamaabdelbary / Shutterstock.com, (b) kandl stock / Shutterstock.com, (c) Jag_cz / Shutterstock.com

How Many Seats? Use the information in the table to compare numbers of seats in different modes of transportation. Then, enter and solve an equation for each comparison.

Mode of Transportation	Number of Seats
Bicycle	1
Motorbike	2
Car	4
Truck	6
Bus	36
Metro Train	48

1. How many times as many seats are in a truck than on a motorbike?

   Equation: ____________________

   Answer: ____________________

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2. How many times as many seats are on a bus than in a truck?

Equation: ______________________

Answer: ______________________

3. How many times as many seats are on the metro train than in a car?

Equation: ______________________

Answer: ______________________

4. A metro train can fit how many times more people than a truck?

Equation: ______________________

Answer: ______________________

5. A bus has how many times more seats than a car?

Equation: ______________________

Answer: ______________________

Photo Credit: Ossamaabdelbary / Shutterstock.com

CONNECT

More Seats to Sail A boat has 12 seats. Write your own problem comparing the number of seats on a boat to another mode of transportation in the table in BUILD. Write and solve an equation for your comparison.

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PRACTICE

Write an equation for each of the following comparisons, and then solve.

1. What number is 5 times greater than 6?

____

2. 36 is 4 times more than what number?

____

3. Ayman ate 4 figs in the morning. His older brother ate 3 times as many. How many figs did his brother eat?

____

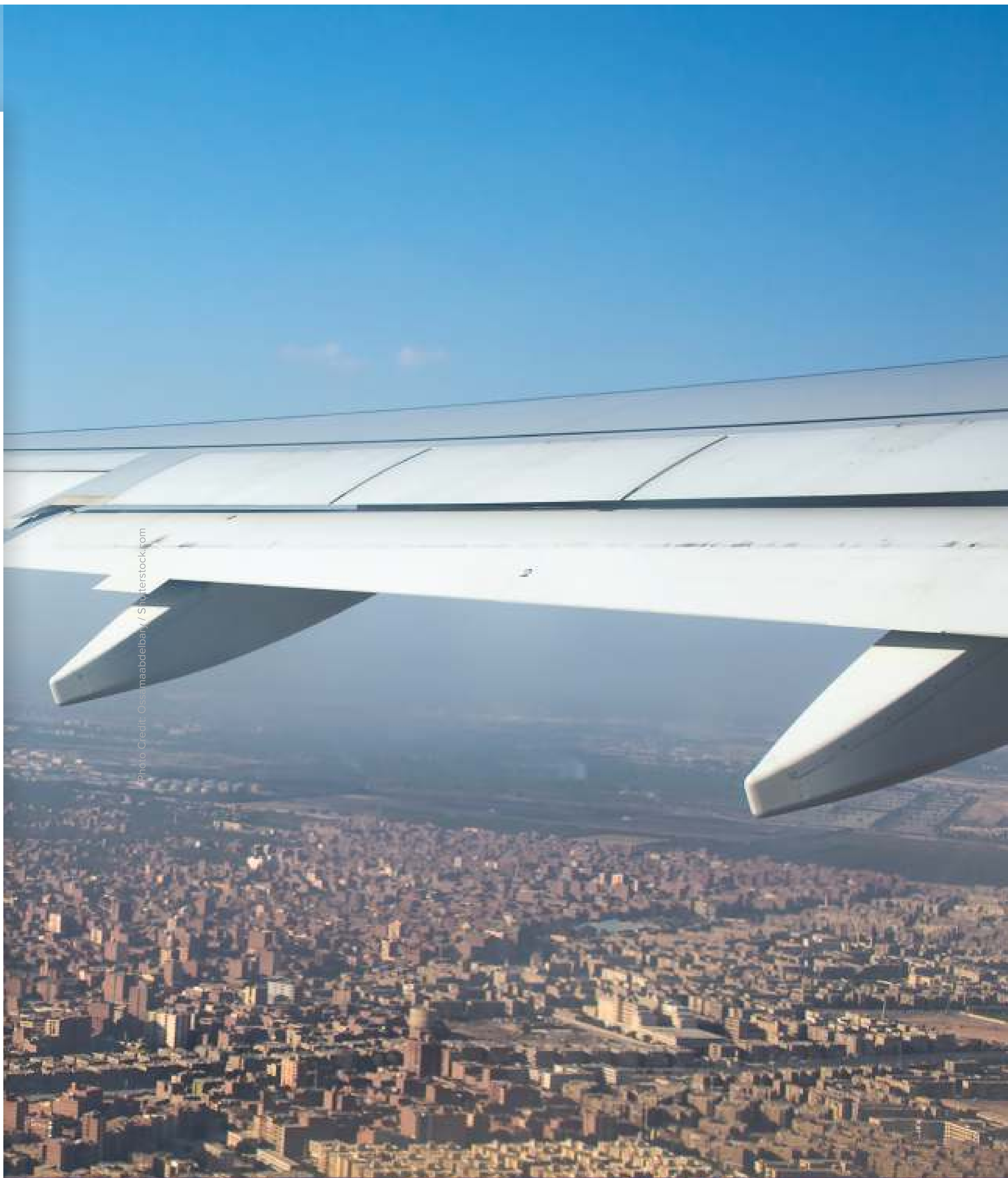
Photo Credit: Ossamaabdelbary / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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CONCEPT 2

Properties and Patterns of Multiplication

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LESSON 4

Commutative Property of Multiplication



Quick Code
egm4067

Learning Targets

- I can explain the **Commutative Property of Multiplication**.
- I can apply the Commutative Property of Multiplication to solve problems with and without an unknown number.

ACCESS

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Toy Cars

Toy Car Number Talk Solve the problem. Give the teacher a Thumbs-Up when you are finished.

Ahmed has 48 toy cars and wants to display them in his room. He wants to arrange them in equal rows and equal columns. How can he display his cars? Draw your solution.

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BUILD

Exploring the Commutative Property of Multiplication Turn and talk about what you remember about the Commutative Property of Multiplication.

Write a definition for the Commutative Property of Multiplication in your own words. Include an example.



Arrays and the Commutative Property

1. Take out your digit cards (1–9). Choose 2 digit cards. Draw an array using the numbers you chose as factors (numbers of rows and columns). Then, use the same numbers to draw a new array. Write an equation for your arrays using the Commutative Property of Multiplication.
2. Repeat the activity until time is up. There is space for you to write 5 array equations.

Photo Credit: Orhan Cam / Shutterstock.com

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Arrays and the Commutative Property

Array Equation 1: _____ x _____ = _____ x _____

Array Equation 2: _____ x _____ = _____ x _____

Array Equation 3: _____ x _____ = _____ x _____

Array Equation 4: _____ x _____ = _____ x _____

Array Equation 5: _____ x _____ = _____ x _____

Photo Credit: Orhan Cam / Shutterstock.com

CONNECT

Writing About Math Read and solve the problem.

There are 42 people who want to play football. Badr says that you can make 6 teams with 7 people on each team. Salma says you can make 7 teams with 6 people on each team. Who is correct? Use numbers, words, and pictures to explain your thinking.

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PRACTICE

Apply the Commutative Property of Multiplication to complete each equation.

1. 5 x 7 = ________ x 5

2. 20 x ________ = 6 x 20

Apply the Commutative Property of Multiplication to find the unknown value.

3. 33 x 4 = 4 x *a* ____________________

4. *b* x 9 = 9 x 8 ____________________

5. Mr. Saleh has 24 beans. Write an equation using the Commutative Property of Multiplication to describe two ways he can arrange his beans.

____

____

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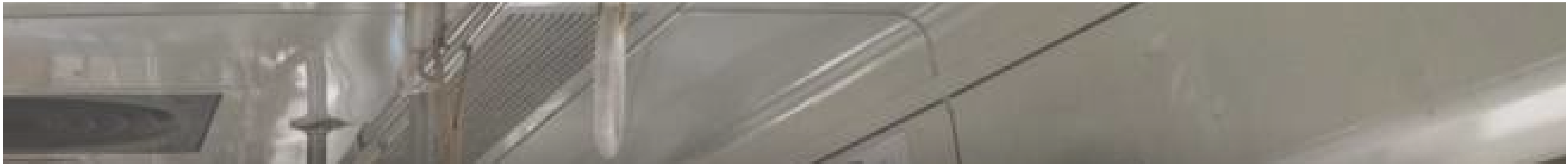


Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 5

Patterns of Multiplying by 10s



Quick Code
egm4068

Learning Targets

- I can explain the **Identity Property** and the **Zero Property of Multiplication**.
- I can apply the Identity and Zero Properties of Multiplication to solve problems.
- I can identify patterns I observe when multiplying by 10, 100, and 1,000.

ACCESS

Mental Math Number Talk Look at the problems below. Solve them mentally (without writing anything down).

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1. 5 x 1
2. 12 x 1
3. 672 x 1
4. 8 x 0
5. 16 x 0
6. 758 x 0

Write a definition for the properties in your own words. Write an example of each using numbers and symbols.

Property	Definition and Example
Identity Property of Multiplication	
Zero Property of Multiplication	

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BUILD

Mental Math Multiplication Read the problem. What do you notice about the problem? What numbers do you think belong in the blanks? Why do you think so?

The metro can get people around the city ________ times as fast

as walking. If the average person walks ________ kilometers an hour, about how fast does the metro go?



Metro Station in Cairo

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Place Value Patterns Talk with a partner about the multiplication problems. Draw place value models to solve the problems. Look for patterns while solving and record your observations.

1 x 4 = ________

10 x 4 = ________

100 x 4 = ________

1,000 x 4 = ________

Thousands	Ones		
Ones	Hundreds	Tens	Ones

Photo Credit: Orhan Cam / Shutterstock.com

Describe the patterns you observe in the problems and their solutions.

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CONNECT

Writing About Math Tarek says that 9 x 1,000 equals 900. What would you tell Tarek to help correct his mathematical thinking? Use words, numbers, or pictures to explain your thinking.

PRACTICE

Follow your teacher's directions to solve the practice problems.

What is the value of each of the following:

1. 100 x 5 = ____________________
2. ____________________ = 1,000 x 2
3. 700 = 7 x ____________________
4. 9 x ____________________ = 9,000
5. Challenge: 4 x 10,000 = ____________________

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 6
Review Exploring Patterns in Multiplication



Quick Code
egm4069

Learning Targets

- I can use place value to multiply by **multiples** of 10, 100, and 1,000.
- I can explain patterns I observe when multiplying by multiples of 10, 100, and 1,000.

ACCESS

Which One Does Not Belong? Look at the problems. Which problem does not belong in the group? Why do you think so? Be prepared to share your thinking.

1. 6 x 100 = 600
2. 9 x 100 = 900
3. 500 x 3 = 1,500
4. 8,000 = 8 x 1,000

Photo Credit: Orhan Cam / Shutterstock.com

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BUILD

Connect and Extend What do you notice about this problem? How is it different from or the same as problems you have seen before?

$$700 \times 3 = ____$$

Talk to a partner about the strategy you would use to solve the problem. Record your strategy and your answer.

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Spinning for Factors

Follow the directions to create and solve multiplication problems with your group.

- One person spins the spinner to create the missing factor.
- Each group member records the number in their book.
- Each group member applies a strategy to independently solve the problem.
- The group compares answers.
- The next person spins the spinner and the game continues.

1. 3,000 x ______ = ______
2. ______00 x 8 = ______
3. ______ x 500 = ______
4. 9 x ______0 = ______
5. 6,000 x ______ = ______
6. ______00 x 5 = ______

Challenge: What strategy (or strategies) did you use to solve the problems? Answer the question on your own.

Explain your strategy for solving Problem 6. How do you know your answer makes sense?

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CONNECT

Writing About Math Read the story problem. Use the properties of multiplication and patterns you have learned to solve the problem. Then, use words and numbers to explain your thinking.



Usain Bolt


SR-71 Blackbird Aircraft

Photo Credit: (a) Orhan Cam / Shutterstock.com, (b) Richard Blake / Vitality / Shutterstock.com, (c) Keith Tarrier / Shutterstock.com

The fastest man in the world is Usain Bolt. He can run about 44 kilometers per hour for short distances. The fastest plane in the world can fly 1,000 times faster than Usain Bolt. How fast can this plane fly?

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PRACTICE

Apply the strategies you have learned to solve the problems.

1. 900 x 3 = ___________________

2. 4 x 40 = ___________________

3. 8,000 x 5 = ___________________

4. 600 x 3 = 3 x ___________________

5. 500 x ___________________ = 3,500

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 7

Exploring More Patterns in Multiplication



Quick Code
egm4070

Learning Targets

- I can explain the **Associative Property of Multiplication**.
- I can apply the Associative Property of Multiplication to solve problems.

ACCESS

Dot Card Number Talk Look at the image. How many dots do you see in the image below? How did you come up with your answer?

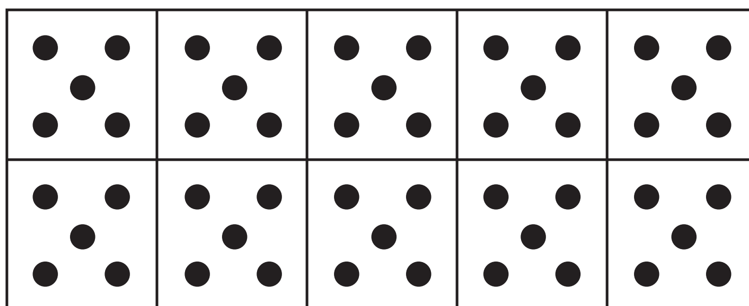


Photo Credit: Orhan Cam / Shutterstock.com

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BUILD

Uncovering the Associative Property of Multiplication Solve the problem assigned by your teacher.

Problem 1: 3 x 2 x 4 = ______

Problem 2: 4 x 2 x 3 = ______

Applying the Associative Property of Multiplication Work with a partner to solve the problems. Place parentheses around the factors that you will multiply first. Rewrite the factors in another order if helpful.

1. 3 x 2 x 5 = ______
2. 4 x 6 x 2 = ______
3. 2 x 9 x 3 = ______
4. 3 x 2 x 3 = ______

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CONNECT

Writing About Math Use what you have learned about the Associative Property of Multiplication to help Farouk solve the problem. Use words and numbers to explain your thinking.

Farouk is trying to solve the problem 2 x 7 x 4.

He starts by solving 2 x 7 and gets 14. Place parentheses to show how Farouk started this problem.

2 x 7 x 4

Next, he writes 14 x 4, but he does not know how to solve that multiplication problem. Can you show Farouk another way to solve the problem?

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PRACTICE

Solve each problem. Multiply the part in the parentheses first. Show your work.

1. (2 x 3) x 4 = ____________________
2. (5 x 2) x 3 = ____________________
3. 2 x (3 x 4) = ____________________
4. 5 x (2 x 3) = ____________________

Place parentheses to show one way to find the product. Then, show one other way to use parentheses to find the product.

5. 5 x 4 x 2

   ____

6. 3 x 6 x 2

   ____

7. Aisha bought 3 packs of water bottles. Each pack had 3 rows of 4 water bottles. How many water bottles did Aisha buy?

Photo Credit: Orhan Cam / Shutterstock.com



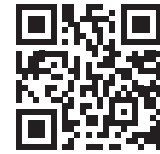
Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 8

Applying Patterns in Multiplication

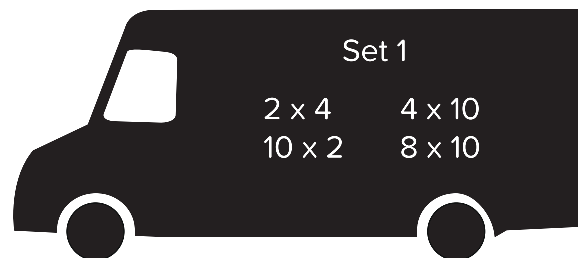

Quick Code
egm4071

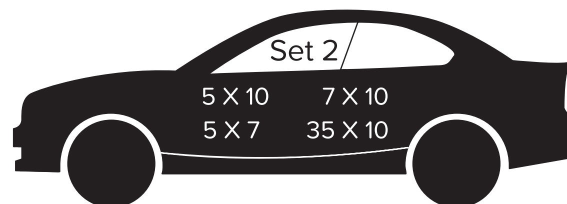
Learning Target

- I can use **decomposing** and the Associative Property of Multiplication to solve equations with multiples of 10, 100, or 1,000.

ACCESS

Review Multiplying by 10 Look at Set 1. Solve each problem mentally. Think about any connections or patterns you notice in each set of problems.





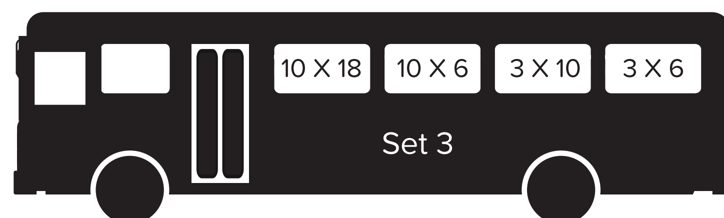


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BUILD

Decomposing Multiples of 10 Decompose each number into a factor pair with 10. Write the missing factor in the box.

1. 40; 10 × ☐

2. 20; 10 × ☐

3. 70; 10 × ☐

4. 50; 10 × ☐

5. 90; 10 × ☐

6. 110; 10 × ☐

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Write how many Tens make up each number.

7. 30 = ______ Tens

8. 80 = ______ Tens

9. 160 = ______ Tens

10. 140 = ______ Tens

11. 120 = ______ Tens

12. 110 = ______ Tens

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Multiplying by Multiples 10, 100, and 1,000 Use decomposing and the Associative Property of Multiplication to solve each problem.

Example: 7 x 20 = ______________________________

1. 5 x 50 = ______________________________

2. 4 x 700 = ______________________________

3. 3 x 4,000 = ______________________________

CONNECT

Writing About Math Review each student's work. Then, answer the questions.

Heba's Work

(4 x 8) x 10
32 x 10
= 320

Ashraf's Work

4 x (8 x 10)
= 4 x 80
= 320

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How is Heba's and Ashraf's work the same? How are they different? Which student's strategy do you prefer? Why?

PRACTICE

Decompose each multiple of 10, 100, or 1,000 before multiplying. Draw parentheses around the numbers you would multiply first, and then write the answer.

1. 5 x 70 = ____________________
2. 8 x 30 = ____________________
3. 4 x 40 = ____________________

Solve using a strategy you prefer.

4. 6 x 90 =

____

5. 7,000 x 6 =

____

6. 600 x 4 =

____

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT

6

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 6
Factors and Multiples

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Unit Video Questions


Quick Code
egm4073

Omar and Mariam are helping their teacher plan a school trip. To determine which type of transportation the school should use for the trip, they will use their understanding of multiplication facts. But they may need help assigning students to seats.

- ☐ What are the different ways seats can be arranged?
- ☐ How would you arrange the students in your class for a field trip?

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CONCEPT 1

Understanding Factors

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LESSON 1
Identifying Factors of Whole Numbers


Quick Code
egm4075

Learning Targets

- I can define **factors** of a whole number.
- I can identify factors of a whole number.
- I can explain patterns I observe in numbers that have 2, 5, or 10 as a factor.

ACCESS

Lots of Rectangles There are 24 seats on an airplane arranged in a rectangle. Each of your counters represents one seat. Use all of your counters to create as many seating arrangements as you can. Draw your rectangles and label the dimensions (width and height).

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Seats on an Airplane

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BUILD

Numbers with Factors of 2, 5, and 10 Count by 2s. Shade the numbers that you say as you count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Count by 5s. Shade the numbers that you say as you count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Count by 10s. Shade the numbers that you say as you count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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Determine if the given number has 2 as a factor, 5 as a factor, or 10 as a factor. Circle yes or no.

	Number	Is 2 a factor?	Is 5 a factor?	Is 10 a factor?
1	26	Yes No	Yes No	Yes No
2	70	Yes No	Yes No	Yes No
3	15	Yes No	Yes No	Yes No
4	17	Yes No	Yes No	Yes No

Finding Factor Pairs Work with your teacher to create a factor rainbow and T-chart for 40.

1. List the factors of 40.

Factor Rainbow **T-Chart**

Photo Credit: Allexanderh / Shutterstock.com

2. List the factors of 36. There are 5 factor pairs.

Factor Rainbow **T-Chart**

3. List the factors of 20. There are 3 factor pairs.

Factor Rainbow **T-Chart**

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CONNECT

Writing About Math Write three numbers that have 2, 5, and 10 as factors. What do the three numbers you wrote have in common?

PRACTICE

Highlight or circle the factors of the numbers listed.

1. 15: 2 5 10
2. 30: 2 5 10
3. 12: 2 5 10
4. 25: 2 5 10
5. 36: 2 5 10

List all of the factors of each number. You may create a factor tree, factor rainbow, or factor T-chart.

6. 25:
7. 19:
8. 48:
9. 16:

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2

Prime and Composite Numbers



Quick Code
egm4076

Learning Targets

- I can identify factors of a whole number.
- I can explain patterns I observe in numbers that have 3, 6, or 9 as factors.
- I can determine if a number is **prime** or **composite**.

ACCESS



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Factor Riddles Listen to the riddles read by your teacher. Solve the riddles and record your answers.

1. The number is an even number between 20 and 30. Some of its factors include 1, 2, 4, 7, and 14. What number is it?

   ______

2. The number is an even number greater than 40. It has 10 as a factor. It is less than 60. What number is it?

   ______

3. The number is a two-digit number. It has 5 as a factor. Its Tens digit is less than its Ones digit. One of its factor pairs is 5 and 7. What number is it?

   ______

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BUILD

Numbers with Factors of 3, 6, or 9 Determine if each number has 3, 6, or 9 as a factor. Explore these patterns:

- A number has 3 as a factor if the sum of the digits is a number that is said when skip counting by 3.

  Example: 63 has 3 as a factor because 6 + 3 = 9 and 9 is a number we say when we skip count by 3s.

- A number has 9 as a factor if the sum of the digits is a number that is said when skip counting by 9s.

  Example: 72 has 9 as a factor because 7 + 2 = 9 and 9 is a number we say when we skip count by 9s.

- A number has 6 as a factor if it has both a factor of 2 and a factor 3. This means it has to be even and the sum of the digits have to be a number said when skip counting by 3s.

  Example: 36 has 6 as a factor because it is even and because 3 + 6 = 9 and 9 is a number we say when we skip count by 3s.

Use these patterns to solve the problems.

1. Is 3 a factor of 53? How do you know?

2. Is 9 a factor of 63? How do you know?

3. Is 6 a factor of 84? How do you know?

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Prime or Composite List all of the factors of each number. Then, write whether the number is prime or composite.

A prime number has exactly two factors: 1 and the number itself.

A composite number has more than two factors.

Prime or Composite?

1. 18

2. 21

3. 31

4. 44

5. 23

Photo Credit: Allexanderh / Shutterstock.com

Prime Numbers Less than 100 Identify all of the prime numbers less than 100. Use skip counting and factor patterns to help you eliminate composite numbers.

1. Circle 2 and cross out all other numbers that you say when you skip count by 2s.
2. Circle 3 and cross out all other numbers that you say when you skip count by 3s.
3. Circle 5 and cross out all other numbers that you say when you skip count by 5s (some are already crossed out).
4. Circle 7 and cross out all other numbers that you say when you skip count by 7s.
5. Circle all numbers that remain except for 1.

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When you are finished, the circled numbers are prime and the crossed out numbers are composite.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	15	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

CONNECT

Writing About Math The seats on the new ferry will be arranged in a rectangle. Is it better for the ferry to have 48 seats or 53 seats? How do you know? Would 49 seats be a good idea? Use numbers, words, and pictures to explain your thinking.



Seats on a Ferry

Photo Credit: Allexanderh / Shutterstock.com, (b) Freedom365day / Shutterstock.com

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PRACTICE

List all the factors of each number. Then, write if the number is prime or composite.

1. 14

2. 46

3. 22

4. 59

5. 50

6. 29

Photo Credit: Allexanderh / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3

Greatest Common Factor



Quick Code
egm4077

Learning Targets

- I can find **common factors** between two whole numbers.
- I can identify the **greatest common factor** between two whole numbers.

ACCESS

Math Fluency Sprint Your teacher will assign you a multiplication facts review activity. Answer as many problems as you can in 60 seconds.

BUILD

Common Factors List the factors of each number. Highlight or circle the common factors of each pair of numbers.

1. 36 and 42

____

2. 18 and 4

____

3. 20 and 30

____

4. 21 and 35

____

5. 17 and 22

____

Photo Credit: Allexanderh / Shutterstock.com

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Finding the Greatest Common Factor Use what you know about factors and common factors to solve each problem.

1. A class is going on a field trip. There are 36 girls and 27 boys in the class. Students will be divided into groups of girls and groups of boys. What is the greatest number of groups that can be made so that each group has the same number of children? How many children will be in each group of boys? How many children will be in each group of girls?

Photo Credit: Allexanderh / Shutterstock.com

2. Amira and her friends are going on a picnic. Amira wants to make snack packs of apples and candy to take on the picnic. She has 24 apples and 36 small bags of candy. What is the greatest number of snack packs Amira can make if each pack must have exactly the same number of apples and exactly the same number of bags of candy with no snacks left over? How many apples will be in each snack pack? How many bags of candy will be in each snack pack?

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3. Mohab is making flower arrangements. He has 7 roses and 14 daisies. If Mohab wants to make all the arrangements identical and have no flowers left over, what is the greatest number of flower arrangements that he can make? How many roses and how many daisies will be in each flower arrangement?


Flower Arrangement

Photo Credit: (a) Allexanderh / Shutterstock.com, (b) Lumia Studio / Shutterstock.com

4. Find the greatest common factor (GCF) of 40 and 50.

5. Find the GCF of 10 and 24.

6. Find the GCF of 33 and 11.

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CONNECT

Writing About Math Describe how a number and its factors are related. Use numbers, words, and symbols to explain your thinking.

PRACTICE

List the common factors of the given numbers.

1. 18 and 24

2. 10 and 35

3. 22 and 44

Photo Credit: Allexanderrh / Shutterstock.com

Find the greatest common factor (GCF) of the given numbers.

4. 40 and 48

5. 12 and 18

6. 10 and 45



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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CONCEPT
2

Understanding Multiples

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LESSON 4
Identifying Multiples of Whole Numbers


Quick Code
egm4079

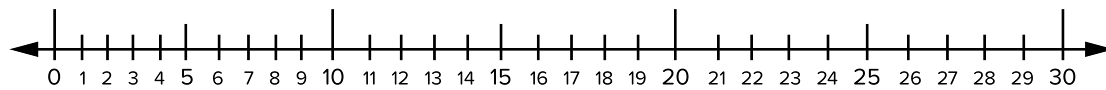
Learning Targets

- I can define **multiples** of whole numbers.
- I can identify multiples of whole numbers.

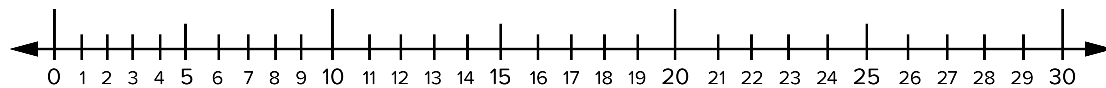
ACCESS

Skip Counting on a Number Line Draw a line connecting each number to show skip counting on the number line. Start at 0 each time.

1. Skip count by 2 on the number line.



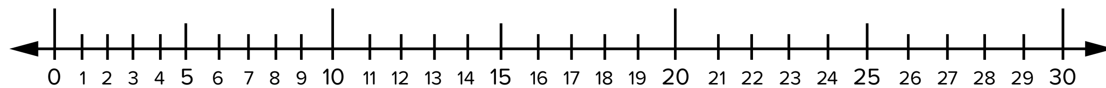
2. Skip count by 3 on the number line.



3. Skip count by 4 on the number line.



4. Skip count by 5 on the number line.



5. Skip count by 10 on the number line.

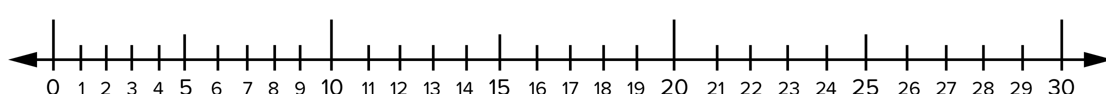


Photo Credit: Mikbiz / Shutterstock.com

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BUILD

Color the Multiples Use the Hundreds charts provided by your teacher to color the multiples.

1. Skip count and color the multiples of 2.
2. Skip count and color the multiples of 3.
3. Skip count and color the multiples of 4.
4. Skip count and color the multiples of 5.
5. Skip count and color the multiples of 6.
6. Skip count and color the multiples of 7.
7. Skip count and color the multiples of 8.
8. Skip count and color the multiples of 9.

Find the Patterns Use Hundreds Charts to help you identify patterns in the multiples of 2, 3, 4, 5, 6, 7, 8, and 9. Then, share your observations about the patterns with a partner. Record your observations.

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Bus Stop

Photo Credit: (a) Mikbiz / Shutterstock.com, (b) Monkey Business Images / Shutterstock.com

CONNECT

Writing About Math Tahani takes the bus home from school every day, but it does not take her directly to her house. After the bus drops Tahani off, she must walk the rest of the way home. The bus she takes stops every 4 kilometers as it leaves the school. If Tahani lives 18 km from school, how far does she have to walk home from the bus stop? Draw a picture to represent your thinking.

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PRACTICE

1. 9 x 4 = ______

2. 6 x 8 = ______

3. Skip count by 8 and fill in the blanks.

   8, ______, 24, ______, ______, 48, ______

4. Highlight or circle the numbers that are multiples of 3.

   6, 17, 21, 15, 10, 36, 29

5. List 5 multiples of 7:

6. Which of the following is NOT a multiple of 4?

   4, 30, 20, 44, 36

7. Is 81 a multiple of 9?

Photo Credit: Mikbiz / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 5

Common Multiples



Quick Code
egm4080

Learning Target

- I can identify **common multiples** of two numbers.

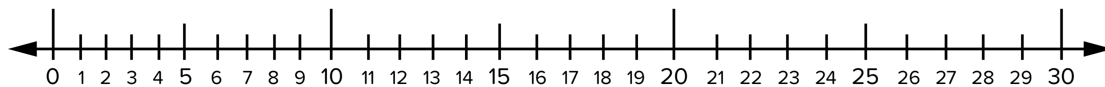
ACCESS


Bus Stop

Photo Credit: (a) Mikbiz / Shutterstock.com, (b) Hiren Ranpara / Shutterstock.com

The Bus Stops Here Show where each bus stops on the number line.

- Bus 1 stops every 3 kilometers.
- Bus 2 stops every 5 kilometers.
- Bus 3 stops every 9 kilometers.



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BUILD

Multiple Match Your teacher will assign you to work with a partner. One of you is Partner A and the other is Partner B. Look at your first card and write 10 multiples on it. Then, look at your partner's first card to see what multiples are in common. Record your answers.

1. Common Multiples of 5 and 2:	2. Common Multiples of 3 and 4:	3. Common Multiples of 8 and 2:
4. Common Multiples of 9 and 3:	5. Common Multiples of 2 and 6:	6. Common Multiples of 1 and 9:
7. Common Multiples of 4 and 5:	8. Common Multiples of 8 and 4:	9. Common Multiples of 5 and 3:

Photo Credit: Mikbiz / Shutterstock.com

See the Similarities List the multiples for each pair of numbers until you find the first two common multiples for each pair.

1. 5 and 7: ______________________
2. 6 and 9: ______________________
3. 6 and 8 ______________________
4. 4 and 7: ______________________

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CONNECT

Writing About Math What is the relationship between a number and its multiples? Use examples to support your thinking.

Photo Credit: Mikbiz / Shutterstock.com

PRACTICE

1. Find a common multiple of 4 and 8:

2. Find a common multiple of 7 and 3:

3. Find two common multiples of 2 and 6:

4. Find two common multiples of 4 and 6

5. Which is a common multiple of 5 and 8: 20, 40, 35

6. Which is NOT a common multiple of 9 and 6: 18, 27, 36



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 6
Relationships between Factors and Multiples


Quick Code
egm4081

Learning Targets

- I can explain the relationship between factors and multiples.
- I can determine if a number is a factor or a multiple of another number.

ACCESS



Multiples Riddles Read each riddle and solve. There may be more than one answer.

1. The number is an odd number. It is a multiple of 3 and 5. It is greater than 20. What number is it?

2. The number is an even number. It is a multiple of 4 and 8. It is between 10 and 20. What number is it?

3. The number is an even number. It is a multiple of 3, 4, and 6. What number is it?

Photo Credit: Mikbiz / Shutterstock.com, (b) StepanPopov / Shutterstock.com

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BUILD

Making Connections Think about the relationships between the numbers in each group. Write at least two sentences describing what you notice. Be ready to share your thinking.

1. 3, 6, and 12

2. 4, 8, 16, and 24

Photo Credit: Mikbiz / Shutterstock.com

3. How are factors and multiples related?

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Factors and Multiples Game Play this game with a partner. Place the factors and multiples cards face down in a pile and shuffle them. Choose one card. One partner writes factors of the number, the other writes multiples. Show each other your work and record your answers in the boxes. Choose another card and switch roles.

Number: Factors: Multiples:	Number: Factors: Multiples:	Number: Factors: Multiples:
Number: Factors: Multiples:	Number: Factors: Multiples:	Number: Factors: Multiples:
Number: Factors: Multiples:	Number: Factors: Multiples:	Number: Factors: Multiples:

Photo Credit: Mikbiz / Shutterstock.com

CONNECT

Writing About Math Reflect on what you have learned about factors and multiples. How do factors and multiples relate to multiplication facts? Use numbers, words, and symbols to support your reasoning.

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PRACTICE

1. Write 3 factors of 30:

2. Write 3 multiples of 6:

3. Is 6 a factor of 24?

4. Is 14 a multiple of 7?

5. Is 24 a factor of 8?

6. Is 16 a multiple of 3?

7. Is 5 a factor of 25 or a multiple of 25?

8. Is 32 a factor of 8 or a multiple of 8?

Photo Credit: Mikbiz / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT 7

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 7
Multiplication and Division: Computation and Relationships

Rod Steel / Shutterstock

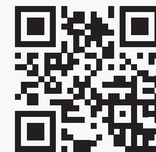


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Container Port

Unit Video Questions



Quick Code
egm4030

The video Container Port shows how goods are stored and transported around the world in arrays. Imagine you have to calculate how many goods are being transported in large containers.

- ☐ How could you use multiplication to calculate large quantities like those in the shipping containers?
- ☐ How could you use division to group large quantities evenly into different containers?

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CONCEPT
1

Multiplying by 1-Digit and 2-Digit Factors

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LESSON 1

The Area Model Strategy



Quick Code
egm4032

Learning Targets

- I can use an **area model** to represent two-digit by one-digit multiplication.
- I can explain how I use place value to multiply.

ACCESS

Notice and Wonder Look at the image that follows. Write down something that you notice and something that you wonder about the image.



I notice ____.

I wonder ____.

BUILD

Quick Draw Use a quick draw to solve the problems that follow.



River Boat on the Nile

Photo Credit: (a) erichon / Shutterstock.com, (b) paintings / Shutterstock.com

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1. Twenty-two passengers can fit on each river bus at a time. What is the maximum number of passengers the river bus can carry if it makes 5 trips?

2. 17 x 4

3. 21 x 3

4. 14 x 5

Multiplying with the Area Model Draw an area model to solve the problems that follow.

1. The route that the river bus travels is 58 kilometers long. How many kilometers does the river bus travel if it follows this route 9 times a day?

2. 35 x 7

3. 91 x 4

4. 88 x 6

Photo Credit: erichon / Shutterstock.com

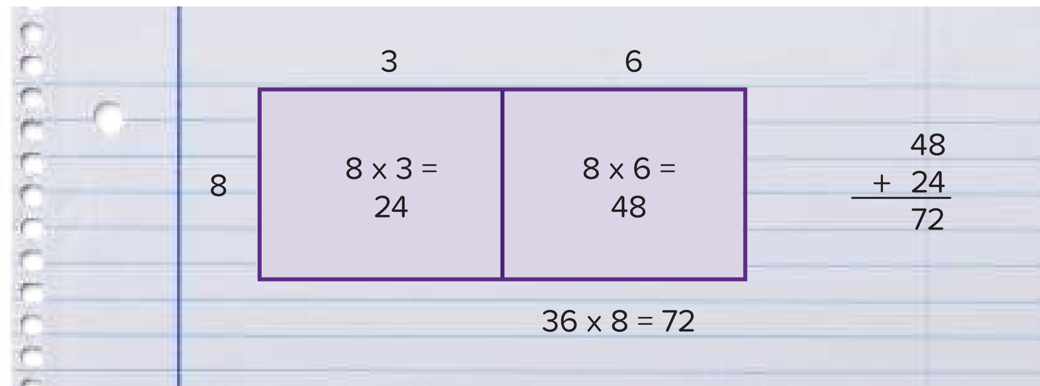
CONNECT

Error Analysis Examine the student work that follows. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

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A student solved the problem 36 x 8 in the following way:



Explain your thinking.

Photo Credit: erichon / Shutterstock.com

PRACTICE

Draw an area model to solve each problem.

1. 9 x 43

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2. 67 x 4

3. 91 x 6

Photo Credit: erichon / Shutterstock.com

4. 5 x 56



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2

The Distributive Property



Quick Code
egm4033

Learning Targets

- I can use an area model to multiply a one-digit number by a whole number with up to four digits.
- I can explain the **Distributive Property of Multiplication**.
- I can apply the Distributive Property of Multiplication to solve multiplication problems.

ACCESS

Decomposing Numbers Fill in the missing number for each decomposition.

1. 536 = 500 + ____________ + 6
2. 1,275 = ____________ + 200 + 70 + 5
3. 264 = 60 + 4 + ____________
4. 7,625 = 5 + 7,000 + 20 + ____________
5. 357 = 50 + ____________ + 7

Photo Credit: erichon / Shutterstock.com

BUILD

The Distributive Property and Area Models Use the area model to solve each problem.

1. 249 x 5

2. 4,734 x 5

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3. 530 x 7

4. 2,391 x 8

Let's Try It Use numbers and symbols to solve each problem. Draw an area model to help you if necessary.

	Problem	Numbers and Symbols	Area Model
1.	32 x 7		
2.	5 x 483		
3.	7 x 723		
4.	1,673 x 8		

Photo Credit: erichon / Shutterstock.com

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CONNECT

Making Connections Read the problem. Solve using an area model or using numbers and symbols. Be prepared to share your thinking.



Bus in the Desert

A city bus is 1,280 centimeters long. What is the length of 3 city buses?

PRACTICE

Use an area model to solve the following equations.

1. 78 x 4

2. 4 x 594

Photo Credit: (a) erichon / Shutterstock.com, (b) Viacheslav Okhrymenko / Shutterstock.com

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3. 1,193 x 5

4. 7 x 206

5. 583 x 6

6. 8 x 4,943

Photo Credit: erichon / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3

The Partial Products Algorithm



Quick Code
egm4034

Learning Target

- I can use the **partial products algorithm** to multiply a one-digit number by a whole number with up to four digits.

ACCESS

The Amazing Race Write as many different ways as you can to represent the number 136. Use a separate box for each representation.

Photo Credit: erichon / Shutterstock.com

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BUILD

Partial Products Use the area model to solve the problem. Then, copy the partial products algorithm solution modeled by your teacher.

Example: 731 x 4

Area Model	Partial Product Algorithm

Problem	Partial Products	Area Model
7 x 59		
624 x 4		
6 x 3,293		

Photo Credit: erichon / Shutterstock.com

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Fill in the Blanks Fill in the blanks with the missing numbers.

1.

```
      239
  x     7
    1,400  (______ x ______)
      210  (______ x ______)
  +    63  (______ x ______)
    1,673
```

2.

```
      6,421
  x       6
     36,000  (______ x ______)
     ______  (6 x 400)
        120  (6 x ______)
  +  ______  (6 x 1)

     ______
```

3.

```
      2,523
  x       5
     10,000  (______ x ______)
     ______  (5 x 500)
        100  (5 x ______)
  +  ______  (5 x 3)

     ______
```

Photo Credit: erichon / Shutterstock.com

CONNECT

Error Analysis Examine the student work that follows. Do you agree or disagree with the student's work and solution?

Solve the problem using the partial products algorithm.

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Student's work:

```
    328
x     4
     32  (8 x 4)
      8  (2 x 4)
+    12  (3 x 4)
     52
```

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: erichon / Shutterstock.com

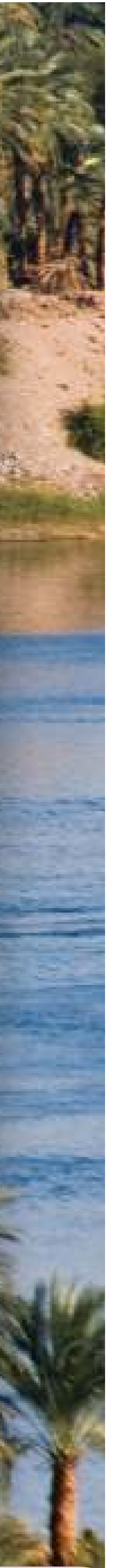
PRACTICE

Solve using the partial products algorithm.

1. 4,731 x 4 =

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2. 29 x 4 =

3. 5 x 343 =

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4. 6 x 678 =



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 4

The Standard Multiplication Algorithm



Quick Code
egm4035

Learning Targets

- I can estimate products.
- I can use the **standard algorithm** to multiply a one-digit number by a whole number with up to four digits.

ACCESS

Similarities in Models Estimate the products of the two problems. Then, solve using the method assigned by your teacher.

1. 64 x 7

   Estimate:

   Solved Answer:

2. 132 x 8

   Estimate:

   Solved Answer:

BUILD

Using the Standard Algorithm Estimate the product for Problems 3–8. Then, solve using the standard algorithm. Multiply using another strategy to help you if necessary.



Cars on a Bridge

Photo Credit: (a) erichon / Shutterstock.com, (b) keem ahmed / Shutterstock.com

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3. 32
x 3

Estimate:

Answer:

4. 17
x 6

Estimate:

Answer:

5. 134
x 2

Estimate:

Answer:

6. 758
x 3

Estimate:

Answer:

7. 1,349
x 2

Estimate:

Answer:

8. 2,327
x 4

Estimate:

Answer:

Photo Credit: erichon / Shutterstock.com



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CONNECT

Writing About Math Three students tried solving 328 x 2 using the standard algorithm. Explain who you think solved the problem correctly, and identify at least one error in another student's solution.

Student 1	Student 2	Student 3
328 x 2 646	1 328 x 2 656	1 328 x 2 746

PRACTICE

1. Use the partial products algorithm to solve the equation.

   284 x 4

2. Use the standard algorithm to solve the equation.

   284 x 4

3. Use an area model to solve the equation.

   630 x 5

4. Use the standard algorithm to solve the equation.

   630 x 5

Photo Credit: erichon / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 5

Review Connecting Strategies



Quick Code
egm4036

Learning Target

- I can use the standard algorithm to multiply a one-digit number by a whole number with up to four digits.

ACCESS

Can You Spot It?



Quad Bikes in the Desert

Photo Credit: (a) erichon / Shutterstock.com, (b) Rostislav Ageev / Shutterstock.com

Ali wants to figure out how many tires are on 1,532 quad bikes. Can you spot where he had to regroup in the problem? Highlight or circle where Ali regrouped and write your own explanation of regrouping.

```
 2 1
 1,532
 x   4
 -----
 6,128
```


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BUILD

Matching the Models Your teacher will distribute some cards. Follow the teacher's directions to cut out the cards.

Play a card and ask the other students in your group to find the matching cards in their sets. Once they have a match, review the steps for solving the problem using the standard algorithm. Where do you see regrouping in the problem? Continue to play until no cards remain.

Fix the Error Look at the standard algorithm solution for each multiplication problem. Circle the problem if the solution is correct. If the solution is incorrect, fix the error.

2
158
x 3
374

2 1
3,142
x 5
15,710

98
x 2
86

1
470
x 4
1,880

1 4 3
1,286
x 6
6,286

Photo Credit: erichon / Shutterstock.com

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CONNECT

Writing About Math Why is it important to have more than one way to solve a problem? Use numbers, words, and symbols to explain your answer.

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PRACTICE

Solve using the standard algorithm.

1. 7 x 30 = ____________
2. 4 x 800 = ____________
3. 27 x 3 = ____________
4. 204 x 2 = ____________
5. 2,213 x 4 = ____________
6. 1,390 x 2 = ____________
7. 735 x 5 = ____________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 6

Two-Digit Multiplication


Quick Code
egm4037

Learning Targets

- I can identify patterns when multiplying two multiples of 10.
- I can multiply a two-digit number by a multiple of 10.
- I can assess the reasonableness of an answer using estimation and mental math.

ACCESS

Mental Math Read each question. Circle your answer. Be prepared to explain your reasoning.

1. Is 56 x 4 closer to 200 or closer to 2,000? 200 2,000
2. Is 156 x 4 closer to 500 or closer to 5,000? 500 5,000

BUILD

Ten Times Predict what you think will happen when you multiply two multiples of 10 together.

30 x 5 = 150

30 x 50 = ____________

2 x 80 = 160

20 x 80 = ____________

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70 x 7 = 490

70 x 70 = ____________

50 x 60 = ____________

90 x 70 = ____________

40 x 40 = ____________

60 x 30 = ____________

Multiplying a 2-Digit Number by a Multiple of 10 Solve each problem using the area model strategy, the partial products algorithm, or the standard algorithm. Use estimation to make sure that your answer is reasonable.

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Buses Parked at a Pyramid

Example: A group of 38 people want to travel by bus. Each bus ticket costs 30 LE. How much do they need to pay in all?

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	Problem	Area Model	Numbers and Symbols
1.	40 x 62		
2.	70 x 55		
3.	54 x 30		
4.	40 x 78		
5.	44 x 20		
6.	15 x 30		
7.	10 x 40		
8.	72 x 40		

Photo Credit: erichon / Shutterstock.com

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CONNECT

Error Analysis Examine the student's work. Is their answer reasonable? How do you know? Explain your thinking.

22 x 50

(20 + 2) x 50

(20 x 50) + (2 x 50)

100 + 100

200

Photo Credit: erichon / Shutterstock.com

PRACTICE

Solve using the area model or the partial products algorithm. Use estimation to check the reasonableness of your answers.

1. 23 x 40 = ______________
2. 20 x 54 = ______________
3. 90 x 32 = ______________
4. 5 x 13 = ______________
5. 10 x 56 = ______________
6. 30 x 78 = ______________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Area Models and Two-Digit Multiplication



Quick Code
egm4038

Learning Target

- I can use the area model to solve two-digit by two-digit multiplication problems.

ACCESS

Be the Teacher Read the story problem and look at the three solutions. Which one is incorrect? How do you know? What mistake was made?

Salma, Saleem, Mira, and Hakeem each saved 240 LE. They wanted to put their money together to buy a remote-control car for 960 LE. Do they have enough money to buy the car?

1.

4 x 240 =

$$\begin{array}{r} {}^{1}240 \\ 240 \\ 240 \\ +\ 240 \\ \hline 960 \end{array}$$

2.

4 x 240 =

4 x 200 = 600
4 x 40 = 80
4 x 0 = 0
600 + 80 + 0 = 680

3.

4 x 240 =

200	40	0
800	160	0

800 + 160 + 0 = 960

Photo Credit: erichon / Shutterstock.com

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BUILD

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Working with the Area Model

For each problem, draw an area model. Then, place your cards in the correct boxes. You do not have to solve the problems.

x		

Photo Credit: erichon / Shutterstock.com

Problems

a. 22 x 17

b. 34 x 19

c. 72 x 15

d. 24 x 37

e. 45 x 29

f. 61 x 26

g. 58 x 44

h. 71 x 51

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CONNECT

Writing About Math Where do you see the Distributive Property of Multiplication in your area models for multiplying two 2-digit numbers?

PRACTICE

Create area models to solve the problems.

1. 45 x 28 = 1,260

2. 81 x 23 = 1,863

Photo Credit: erichon / Shutterstock.com

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3. 60 x 12 = 720

4. There are 6 people who won 145 pounds each at the fair. How much money did they win all together?

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 8
Algorithms and Two-Digit Multiplication


Quick Code
egm4039

Learning Target

- I can apply a variety of strategies to solve two-digit by two-digit multiplication problems.

ACCESS

Just the Facts Think about the question: How have we used facts, patterns, and relationships to help us learn challenging mathematics? Record your thinking.

BUILD

From Area Models to Partial Products Estimate each product. Then, solve using the partial products algorithm. Draw an area model to help you if necessary.

1. 53 x 28

Estimate ______________________

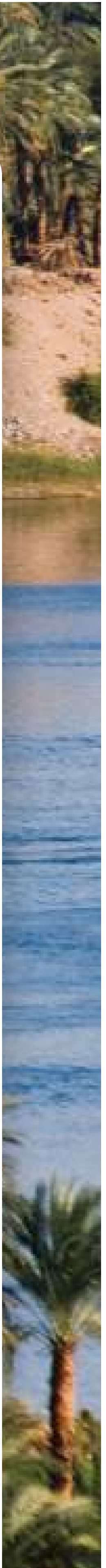
Partial Products ______________________

Area Model

Photo Credit: erichon / Shutterstock.com

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2. 38 x 75

Estimate ______________________

Partial Products ______________________

Area Model

3. 44 x 39

Estimate ______________________

Partial Products ______________________

Area Model

Photo Credit: erichon / Shutterstock.com

Let's Try the Standard Algorithm Estimate each product. Then, solve using the standard algorithm.

1. 52 x 36

Estimate ________

Partial Products ________

Standard Algorithm ________

2. 63 x 28

Estimate ________

Partial Products ________

Standard Algorithm ________

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3. 46 x 25

Estimate ___________

Partial Products ___________

Standard Algorithm ___________

4. 39 x 18

Estimate ___________

Partial Products ___________

Standard Algorithm ___________

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CONNECT

Writing About Math Reflect on the different multiplication strategies you have learned for multiplying two 2-digit numbers. Which multiplication strategy is easiest for you to use? Why do you think that is? Which strategy do you want to practice more?



Cairo Skyline

Photo Credit: (a) erichon / Shutterstock.com, (b) Orhan Cam / Shutterstock.com

PRACTICE

Solve using any method.

1. 67 x 21 = ____________
2. 43 x 34 = ____________
3. 76 x 15 = ____________
4. 54 x 59 = ____________
5. 83 x 15 = ____________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 9
Putting It All Together


Quick Code
egm4040

Learning Targets

- I can apply the Three Reads strategy to analyze and solve story problems.
- I can add, subtract, or multiply to solve story problems.

ACCESS

Number Talk Solve the problem using any strategy you like.

34 x 89

Photo Credit: erichon / Shutterstock.com

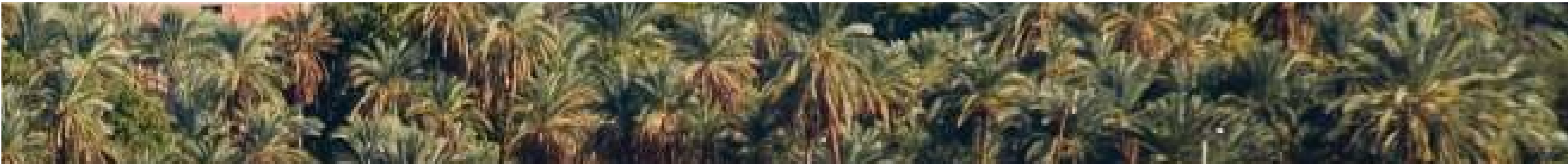
BUILD

Three Reads Read each problem three times. After each read, answer the question.

Problem 1

Aya paints pictures and sells them at art shows. She charges 56 LE for a large painting. She charges 24 LE for a small painting. Last month she sold six large paintings and three small paintings.

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Read Number	Question	Answer
1	What is happening in the problem?	
2	What quantities are in the problem?	
3	What mathematical questions can you ask about this situation?	

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Fill in the question as your teacher reads it aloud.

Aya paints pictures and sells them at art shows. She charges 56 LE for a large painting. She charges 24 LE for a small painting. Last month she sold six large paintings and three small paintings.

Solve the problem. Show your work.

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Talaat Harb Square in Cairo

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Problem 2

On Thursday, the Meat King Market sold 210 kilograms of ground beef. On Friday, it sold twice that amount. On Saturday, it sold only 130 kilograms.

Read Number	Question	Answer
1	What is happening in the problem?	
2	What quantities are in the problem?	
3	What mathematical questions can you ask about this situation?	

Solve the problem. Show your work.

On Thursday, the Meat King Market sold 210 kilograms of ground beef. On Friday, it sold twice that amount. On Saturday, it sold only 130 kilograms. How much more meat did the market sell on Friday than on Saturday?

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Story Problem Match Your teacher will give you a card with either a story problem or the steps to finding the solution to a story problem. Find the student whose card goes with yours, write the number of the problem, then work with your partner to solve the problem. Show your work.

Problem Number ______________________________

Solve the problem. Show your work.

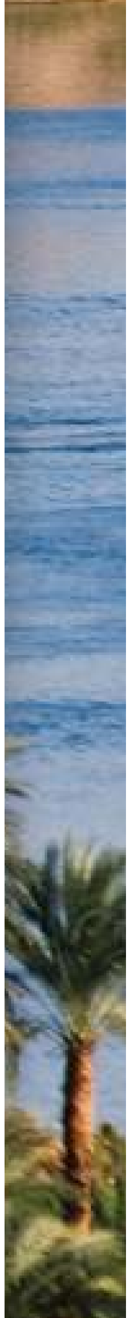
Problem Number ______________________________

Solve the problem. Show your work.

Problem Number ______________________________

Solve the problem. Show your work.

Photo Credit: erichon / Shutterstock.com



CONNECT

Writing About Math Did any of the story problems today remind you of a time when you used math in real life? Have you ever used math at the market? When playing with your friends? When cooking with your family?

Write about a time when you used math to solve a problem outside of school.

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PRACTICE

Solve using any method.

1. 503 x 8

2. Malik walked 8 kilometers on Friday and 6 kilometers on Saturday. He did this every weekend for 6 weeks. How many kilometers did he walk by the end of 6 weeks?

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3. The Super Bus has a total of 76 seats. The Super Rail seats 3 times as many people as the Super Bus and 53 more people than the Super Ferry. How many people do the Super Bus, Super Rail, and Super Ferry seat all together?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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CONCEPT 2

Dividing by 1-Digit Divisors

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LESSON 10

Exploring Remainders



Quick Code
egm4042

Learning Targets

- I can identify the **dividend**, **divisor**, and **quotient** of a division problem.
- I can solve division problems.
- I can explain what a **remainder** represents in a division problem.

ACCESS

Compare and Connect Read each problem with a partner. Answer each problem.

1. There are 8 teams playing soccer. There are 9 students on each team. How many students are there in all?

2. There are 72 students on the field. They want to make teams with 9 students on each team. How many teams will they be able to make?

Photo Credit: Pat Shrader / Shutterstock.com

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3. There are 72 students on the field. They want to split into 8 teams. How many students will be on each team?

4. How are the problems alike? How are they different?

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BUILD

What Is Left? Draw a picture to show your thinking.

Saleem brought 15 pies to give to 4 of his friends. How can Saleem share the pies equally?

Equation ____________________

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Getting to Zamalek Write equations that show how many of each form of transportation you would need to get the people to their event. Note if there would be people left out (remainder). Draw a picture to help you if necessary.



Zamalek Island

Photo Credit: (a) Pat Shrader / Shutterstock.com, (b) Mohamed Hakem / Shutterstock.com

Thirty-two people need to travel to a special event in Zamalek. There are many different ways they can travel to the event. They can only choose one of the ways to travel for the whole group of people. Look at all of the forms of transportation they can take on the chart.

Form of Transportation	How Many People Can Fit on Each	Equation
Microbus	9	
Motorbike	2	
Car	4	
Van	7	

Which form of transportation should the group take to the event? Explain your answer.

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CONNECT

Going to a Swim Meet The swim team is taking a bus to a swim meet. Each bus seats 40 students. Sixty students will attend the meet. How many buses are needed? Use numbers, words, and symbols to explain your thinking.

PRACTICE

Solve each problem. Show your work.

1. 35 ÷ 6 = ________

2. ________ = 22 ÷ 6

3. There are 48 mugs that need to be put in boxes and shipped. Five mugs can fit in each box. How many boxes will be needed to ship the mugs? ________

Photo Credit: Pat Shrader / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 11

Patterns and Place Value in Division


Quick Code
egm4043

Learning Target

- I can use place value, multiplication facts, and patterns with zeros to divide multiples of 10, 100, and 1,000 by one-digit divisors.

ACCESS



Division Array Game

Follow the instructions to create arrays to show division problems.

Materials per two players

- Number cards 6–25
- One 6-sided number cube
- One piece of graph paper

Objective of the game

- To have the highest total score

Directions

1. Shuffle the number cards. Place the deck with the numbers facing down on the table.
2. Player A draws a number card. This number becomes the dividend.

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Division Array Game

3. Player A rolls the number cube. The number on the number cube is the divisor. Fill in this many squares per row on the graph paper until you reach the dividend. You may have squares left over that do not fill a whole row. These are remainders.
4. Fill in the information in the chart, including if there are any leftover squares.
5. Player A's score is the number in the "number of rows" column. If all the squares were used in the array (no remainders), then Player A's score is double the number of rows.
6. Keep track of the score in the chart. The player with the highest total score after 5 rounds wins.

Round	Total Number of Squares (Dividend)	Squares per Row (Divisor)	Number of Rows (Quotient)	Leftover Squares (Remainder)	Score
Example	23	4	5	3	5
1					
2					
3					
4					
5					
				Total Score	

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BUILD

Division Patterns Label the parts in the equation using the words divisor, dividend, and quotient. Then, look for patterns to complete the remaining problems. The first problem in the table is an example that is filled in for you.

600 ÷ 3 = Answer

600 is called the ______________________.

3 is called the ______________________.

The answer is called the ______________________.

Equation	Related Fact	Quotient
600 ÷ 3	6 ÷ 3 = 2	200
150 ÷ 5		
1,200 ÷ 6		
200 ÷ 4		
700 ÷ 7		
6,400 ÷ 8		
4,500 ÷ 9		
270 ÷ 3		

How did you use facts and patterns you know to help you solve the problems?

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CONNECT

Riding the Metro

There are 8,100 people that need to get to work on Monday morning at 7:00 a.m. They all want to take the Metro to work. There are 9 cars on each Metro. If 90 people can fit in each car, can all the people take the same metro to work? Explain your thinking using numbers, words, and symbols.



Tahrir Square

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PRACTICE

Use multiplication facts and patterns with zeros to solve the problems.

1. There were 540 crayons in a large bin. Students were asked to put 9 crayons in a small box for each student to use. How many small boxes will students need in order to complete this task?

2. Write the number 892 in expanded form.

3. 180 ÷ 2 = ___________

4. 6,400 ÷ 8 = ___________

5. 20 = 120 ÷ ___________

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 12

The Area Model and Division



Quick Code
egm4044

Learning Target

- I can use area models to represent and solve division problems.

ACCESS

Target Number Your teacher will give you a number card. You will use your number to help create a target number.



Cars Going Under An Overpass

Photo Credit: (a) Pat Shrader / Shutterstock.com, (b) Adwo / Shutterstock.com

BUILD

Understanding the Area Model Solve each problem using an area model.

1. An organization donated 89 books to a school. The books will be shared among 6 classrooms. How many books will each classroom get?

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2. Rashida saved 545 LE to buy a toy car. She did this by saving 5 LE every day she worked around her neighborhood. How many days did she have to work to save enough money to buy a toy car?

3. Amir bought a book of stickers. There were 92 stickers in the book. He wanted to give them to 4 of his friends. How many stickers will each of his friends get?

CONNECT

Writing About Math There are 492 cars that need to park at the stadium. The stadium has 4 parking lots. The stadium wants the same number of cars to park in each lot. How could you use Problem 3 to help you solve 492 ÷ 4? Use words, numbers, and symbols to explain your thinking.

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PRACTICE

Use the area model to solve the problems. Show your work.

1. There are 864 pencils. The pencils have to be divided equally among 4 classrooms. How many pencils will each classroom get?

2. 3200 ÷ 8 = ___________

3. 67 ÷ 3 = ___________

4. 455 ÷ 4 = ___________

Photo Credit: Pat Shrader / Shutterstock.com



Check Your Understanding

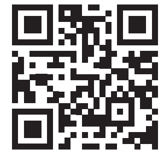
Follow your teacher's instructions to complete this activity.

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LESSON 13

The Partial Quotients Algorithm


Quick Code
egm4045

Learning Target

- I can use the partial quotients algorithm to solve division problems.

ACCESS

Model Match Write the division problem that matches each area model. Remember to include the quotient and remainder, if there is one.

1.

6	300	60	18
	50	10	3

2.

4	4,000	1,200	400	28	
	1,000	300	100	7	R3

Photo Credit: Pat Shrader / Shutterstock.com

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BUILD

Partial Quotients Algorithm Solve each problem using the partial quotients algorithm. Decide who will solve each problem with your group. You will each teach each other how to solve your problem.

Example

4 | 897

Problem 1

4 | 892

Problem 2

5 | 590

Problem 3

3 | 1,216

Problem 4

6 | 925

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Photo Credit: Pat Shrader / Shutterstock.com

CONNECT

Writing About Math Look at the two different strategies for solving 812 ÷ 4. Describe how the area model and the partial quotients algorithm are similar and how they are different.

812 ÷ 4 = 203	
Area Model	Partial Quotients
4 | 4 x 200 = 800 | 4 x 3 = 12 | 0 | 200 + 3 = 203	4 | 812 800 | 200 12 | 3 12 0 200 + 3 = 203

PRACTICE

Solve using the partial products algorithm. Show your work.

1. The owner of a fruit market has 480 cups. If he wants the cups to last for 3 months, how many cups should he plan to use each month?

2. 7,830 ÷ 5 = ___________

3. 244 ÷ 6 = ___________

4. 517 ÷ 4 = ___________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 14
The Standard Division Algorithm


Quick Code
egm4046

Learning Targets

- I can estimate quotients using place value and patterns in multiplication and division.
- I can use the standard algorithm to solve division problems.

ACCESS

Let's Estimate Use estimation to answer the questions. Circle your answer. Be ready to explain your reasoning.

Will 1,836 ÷ 3 be closer to 60 or 600?

Will 7,158 ÷ 3 be closer to 2,000 or 3,000?

Will 736 ÷ 4 be closer to 100 or 200?

Will 491 ÷ 4 be closer to 120 or 150?

Photo Credit: Pat Shrader / Shutterstock.com

BUILD

Find the Similarity Estimate the quotient and then do a Quick Draw of the problem.

1. 68 ÷ 4

   The quotient will be between __________ and __________.

   Quick Draw

   Standard Algorithm

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2. 457 ÷ 3

The quotient will be between __________ and __________.

Quick Draw

Standard Algorithm

Photo Credit: Pat Shrader / Shutterstock.com

Let's Try It Solve the problems using the standard algorithm.

1. 454 ÷ 3

2. 778 ÷ 2

3. 368 ÷ 3

4. 4,858 ÷ 4

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CONNECT



Train in Egypt

Photo Credit: (a) Pat Shrader / Shutterstock.com, (b) Khaledkhwaja / Shutterstock.com

Making Connections

A train has 784 seats for passengers. If there are 7 cars on the train and each car has the same number of seats, how many passengers can sit in each car? Solve the problem using at least two different strategies.

$784 \div 7$

First strategy

Second strategy

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PRACTICE

Solve using the standard division algorithm. Show your work.

1. 240 ÷ 6 = __________
2. 1,500 ÷ 5 = __________
3. 414 ÷ 4 = __________
4. 761 ÷ 6 = __________
5. 5,765 ÷ 5 = __________

Photo Credit: Pat Shrader / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 15

Division and Multiplication



Quick Code
egm4047

Learning Targets

- I can use properties of place value to accurately record quotients.
- I can use multiplication to check answers to division problems.

ACCESS

Spot the Difference Study the two division problems solved using the standard algorithm. Identify as many differences as you can between the two problems.

$\begin{array}{r} 313 \\ 3\overline{)939} \\ -900 \\ \hline 39 \\ -\ \ 30 \\ \hline 9 \\ -\ \ \ 9 \\ \hline 0 \end{array}$	$\begin{array}{r} 92\ \text{R1} \\ 3\overline{)277} \\ -270 \\ \hline 7 \\ -\ \ \ 6 \\ \hline 1 \end{array}$

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BUILD

Place Value and the Quotient First, circle the problems you think will have a quotient with fewer digits than the dividend. Then, estimate the quotient and solve each problem using the standard algorithm for division. Think about where to place the first digit in the quotient.

1. 346 ÷ 5

   The quotient is between __________ and __________.

   Solution

2. 1,266 ÷ 6

   The quotient is between __________ and __________.

   Solution

3. 834 ÷ 3

   The quotient is between __________ and __________.

   Solution

4. 1,429 ÷ 7

   The quotient is between __________ and __________.

   Solution

5. 4,590 ÷ 3

   The quotient is between __________ and __________.

   Solution

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6. 562 ÷ 8

The quotient is between __________ and __________.

Solution

Checking Your Answer Select three problems from Place Value and the Quotient to check.

CONNECT

From Cairo to Alexandria Kazem wants to travel from Cairo to Alexandria, which is a distance of 218 kilometers. He plans to stop 3 times along the way. After how many kilometers should he plan to stop? Do not solve this problem. Instead, explain how you would help a friend solve it. What steps would you tell them to take? How should they check their answer? Record your thinking.


Alexandria Beach

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PRACTICE

Follow your teacher's directions to solve the practice problems.

1. Solve the problems.
   a. 27 ÷ 5 = ________
   b. 156 ÷ 4 = ________
   c. 2,704 ÷ 3 = ________
   d. 583 ÷ 6 = ________
   e. 6,524 ÷ 4 = ________

Photo Credit: Pat Shrader / Shutterstock.com



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 16

Solving Challenging Story Problems



Quick Code
egm4048

Learning Targets

- I can organize information in story problems to determine when to add, subtract, multiply, or divide.
- I can use addition, subtraction, multiplication, and division to solve story problems.

ACCESS

What Is the Problem? This student used multiplication to check their answer to a division problem. Write the division problem that matches the multiplication problem shown.

$$\begin{array}{lr} & 23 \\ \times & 7 \\ \hline & 21 \\ + & 140 \\ \hline & 161 \end{array}$$

_______ ÷ _______ = _______

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BUILD

Three Reads Read each problem three times. After each read, answer the question for that read in the chart that follows.

Problem 1



Tomatoes on the Vine

Photo Credit: (a) Pat Shrader / Shutterstock.com, (b) eugenegurkov / Shutterstock.com

Ahmed and his mom want to plant a garden. They buy 35 tomato plants, 16 carrot plants, and 9 beet plants. They want to put the plants into rows of 6.

Read Number	Question	Answer
1	What is happening in the problem?	
2	What quantities are in the problem?	
3	What mathematical questions can you ask about this situation?	

Fill in the question as your teacher reads it aloud.

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Solve the problem. Show your work.



Problem 2

Over the course of 20 weeks, Sarah collected 14 kilograms of cans to recycle. Saleem collected 6 times as much as Sarah. The cans need to be put into bags to take to the recycling center. Each bag holds 7 kilograms of cans.

Read Number	Question	Answer
1	What is happening in the problem?	
2	What quantities are in the problem?	
3	What mathematical questions can you ask about this situation?	

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Solve the problem. Show your work.

How many bags will Saleem need for his cans?

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Show and Solve Move around the room locating and solving the story problems you see. Write the number of the problem, then show your work and solve.

Problem Number	Solution

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CONNECT

Comparing Answers Find someone who solved one of the same problems as you. Compare your answers. Discuss the steps and the strategies you used to solve the problem. Record at least one similarity and one difference you observe.

PRACTICE

Solve using the standard algorithm. Show your work.

1. 534 ÷ 6 = ________
2. Hady has 347 marbles. Kamal has 4 times as many as Hady. Hala has 799 fewer than Kamal. How many marbles does Hala have?
3. Yahia placed 21 paints equally on 3 tables. How many paints were placed on each table?

Photo Credit: Pat Shrader / Shutterstock.com





Check Your Understanding

Follow your teacher's instructions to complete this activity.

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UNIT

8

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Theme 2 | Mathematical Operations and Algebraic Thinking

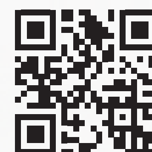
Unit 8
Order of Operations



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Unit Video Questions



Quick Code
egm4091

Omar and Mariam are taking a school trip to a factory. They learn how the factory makes cars. The guide explains the order of each step and why the order matters. After the school trip, Omar and Mariam want to know what else has an order and where the order matters.

- ☐ What has an order in your school or home?
- ☐ Does the order matter? What happens if the order is changed?
- ☐ In mathematics, are there any operations in which order matters? What are they? Give examples of what happens if the order is changed.

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CONCEPT 1

Order of Operations

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LESSON 1
Problem-Solving Strategies


Quick Code egm4093

Learning Target

- I can apply strategies to solve addition, subtraction, multiplication, and division problems.

ACCESS

Information Gap Work in groups of three. Each of you will receive a card containing either a number or a symbol. Work together to create, record, and solve a math problem. Continue creating and solving as many problems as you can. Record your work here.

Photo Credit: givaga / Shutterstock.com

BUILD

Strategies We Know Solve the problems using any strategy you choose. Show your work.

1. 349 + 199 = ____________
2. 9,230 – 455 = ____________
3. 62 x 18 = ____________
4. 678 ÷ 6 = ____________

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Solve It Estimate and then solve each problem. Practice using efficient strategies for each operation.

1. 5,612 – 56 = ____________ Estimate ____________
2. 3,267 + 1,892 = ____________ Estimate ____________
3. 6 x 127 = ____________ Estimate ____________
4. 9,284 + 371 = ____________ Estimate ____________
5. 1,892 ÷ 9 = ____________ Estimate ____________
6. 42 x 70 = ____________ Estimate ____________
7. 9,036 – 1,425 = ____________ Estimate ____________
8. 268 ÷ 7 = ____________ Estimate ____________

CONNECT

Writing About Math Why is it important to learn to use a strategy that is efficient and effective when solving a math problem? Explain your thinking using words, numbers, or pictures.

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Boats along the Nile

Photo Credit: (a) givaga / Shutterstock.com, (b) Nasser Gad / Shutterstock.com

PRACTICE

Solve using any strategy. Show your work.

1. 1,789 + 472 = ____________
2. 5 x 472 = ____________
3. 725 ÷ 8 = ____________
4. 8,572 – 188 = ____________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2
Which Comes First?


Quick Code
egm4094

Learning Target

- I can use the **order of operations** to solve problems with two operations.

ACCESS

Number Talk Solve each problem on your own. Then, work with a partner to draw a line between related problems. Write another problem that is related to each pair. Be prepared to share your thinking about how these equations are related.

1. 8 x 4 = ______
2. 72 ÷ 9 = ______
3. 64 ÷ ______ = 8
4. 100 ÷ 20 = ______

A. 8 x 8 = ______
B. 100 ÷ 5 = ______
C. 32 ÷ 4 = ______
D. 9 x ______ = 72

Photo Credit: (a) givaga / Shutterstock.com, (b) Mohammed Hamza / Shutterstock.com


Cairo after Sunset

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BUILD

Exploring the Order of Operations Solve each puzzle. When you figure out the number that each picture represents, write the value above the picture. Remember the order of operations.

Order of Operations

Parentheses

Multiplication and Division (left-to-right)

Addition and Subtraction (left-to-right)

Photo Credit: givaga / Shutterstock.com

1.

rectangle + rectangle + rectangle = 12

rectangle + rectangle + triangle = 18

circle + triangle + triangle = 26

triangle + circle x rectangle = ____

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2.

(eye) + (eye) + (eye) = 18

(eye) + (ankh) + (eye) = 23

(ankh) + (pyramid) + (pyramid) = 17

(pyramid pyramid) x (eye) + (ankh ankh) = ______

3.

(trapezoid) + (trapezoid) + (trapezoid) = 27

(pentagon) + (trapezoid) x (pentagon) = 80

(pentagon) + (pentagon) x (ring) = 48

(pentagon pentagon) + (ring) x (trapezoid trapezoid) = ______

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4.

😊😊	+	😊😊	+	😊😊	=	36
❤	+	❤	x	😊	=	28
❤	x	🌈	+	❤	=	44
❤❤	+	🌈	x	😊	=	______

Photo Credit: givaga / Shutterstock.com

5.

☀	+	☀	+	☀	=	27
☀	+	☀	+	💧💧💧	=	22
💧💧💧	+	💧💧💧	+	☁	=	18
💧💧💧	x	☁☁	+	☀☀	=	______

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CONNECT

Writing About Math Why is the order in which we perform operations when solving problems important?

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PRACTICE

Follow the standard order of operations to solve.

1. 8 x 2 + 13 = ______
2. 5 x 6 – 12 = ______
3. 200 – 80 x 2 = ______
4. 5 + 8 ÷ 2 = ______
5. 20 ÷ 5 + 5 = ______



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 3
Order of Operations


Quick Code
egm4095

Learning Target

- I can use the order of operations to solve problems with multiple operations.

ACCESS

Which Does Not Belong? Solve the problems. Then, think about which problem does not belong in the set. Highlight or circle the problem you think does not belong and explain your thinking.

1. 6 x 4 – 4 = ___________
2. 100 – 80 x 1 = ___________
3. 60 + 20 – 50 = ___________
4. 2,356 – 2,336 = ___________


Tourist Bus

Photo Credit: (a) givaga / Shutterstock.com, (b) zevana / Shutterstock.com

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BUILD

Find the Answer Work with your partner to solve each problem. Locate the correct answer and write the equation under it. If the answer is not listed, rewrite the problem under "Other."

2 + 4 x 6	24 – 8 ÷ 4 + 6	15 ÷ 5 + 4 + 1
48 ÷ 4 + 9	36 ÷ 9 + 4	15 – 7 + 2 + 6
7 + 70 ÷ 10 – 2	99 – 10 x 9 + 7	8 x 2 + 24 – 12
49 – 7 x 6 + 4	12 – 72 ÷ 12 + 2	24 + 36 ÷ 6 + 2
8 x 3 + 6 + 2	80 ÷ 10 + 6 – 3	40 – 7 x 5 + 2

8

11

16

28

32

Other

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CONNECT

Who Is Correct? Saleem and Sarah both solved the problem 74 – 61 + 8 x 5. Saleem says the answer is 105 and Sarah says the answer is 53. Who is correct? How do you know? Help the person who is not correct realize their mistake.

Photo Credit: givaga / Shutterstock.com

PRACTICE

Solve the problems. Show your work.

1. 18 x 2 + 8 – 3 = ___________
2. 73 – 60 + 15 ÷ 3 = ___________
3. 4 + 4 + 5 x 10 = ___________
4. 80 ÷ 8 – 7 = ___________



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 4

The Order of Operations and Story Problems



Quick Code
egm4096

Learning Targets

- I can use the order of operations to solve problems with multiple operations.
- I can write and solve an equation to represent what is happening in a multistep story problem.

ACCESS

Number Talk Solve the problems. Then, rewrite each problem more efficiently.

1. 67 + 67 + 67 + 67 + 67 – 15 = ____________________

2. 568 + 78 – 4 – 4 – 4 – 4 – 4 – 4 – 4 – 4 = ________________________

Photo Credit: givaga / Shutterstock.com

BUILD

The Order of Operations and Story Problems Use numbers and symbols to represent what is happening in each problem, and then solve. Remember the order of operations.

1. Abdullah loves collecting stamps. He received 246 stamps for his birthday. He kept 25 of the stamps and now he wants to give the rest to 6 of his friends. How many stamps will each friend get if they share them equally?

2. Maha walked 14 kilometers every day for 2 weeks. The next week she walked 56 kilometers. How many kilometers did she walk over those 3 weeks?

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3. Ashraf has to take the bus to work. It takes 27 minutes to get to the bus stop near his job. Then, he has to walk for 12 minutes from the bus stop to his place of work. How many minutes does Ashraf spend going to work during a 5-day week?

4. A group of tourists are taking a tour of Alexandria. There are 172 tourists and 8 tour guides in the group. They want to travel to the pyramids in microbuses. Each microbus fits 9 people. How many microbuses will they need in order to get everyone to the pyramids?

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Microbuses in the Desert

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5. Sita wants to bake berry muffins. Each muffin will have 6 berries in it. She buys 198 berries from the store. On the way home, she eats 17 of the berries. How many muffins can she make with the berries she has left?

CONNECT

Writing My Own Problem Write a story problem that can be represented by (50 – 36) ÷ 4.

Photo Credit: givaga / Shutterstock.com

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PRACTICE

Solve using the order of operations. Show your work.

1. 89 + 2 – 4 x 3 = ___________

2. There are 194 people at a concert. After the concert, 43 people leave in cars. The remaining people want to take microbuses home. If 9 people can fit on each microbus, how many buses are needed to get everyone home from the concert? Use numbers and symbols to represent what is happening in the problem, and then solve.

Photo Credit: givaga / Shutterstock.com

3. Bilal buys 6 packages of balloons. Each package contains 18 balloons. He wants to give the balloons to his friends at his birthday party. If he has 8 friends at the party, how many balloons can each friend take home? Use numbers and symbols to represent what is happening in the problem, and then solve.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

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Primary 4 Resources

- Glossary
- Index



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Glossary

A

a.m.
A time between 12:00 midnight and 12:00 noon.

acute angle
An angle with a measure less than 90°.

acute triangle
A triangle with no angle measuring 90° or more.

add
To combine or join together; put together two or more quantities.

addend
Any number being added. In the equation $6 + 8 = 14$, six and eight are both addends, 14 is the sum.

additive comparison
Problems that ask how much more (or less) one amount is than another.

Additive Identity Property of 0
When you add zero to a number, the sum is that same number.

algorithm
A step-by-step method for computing.

analyze
To study or examine something in detail.

angle
Two rays that share an endpoint.

angle measure
The measure of the size of an angle. It tells how far one side is turned from the other side. A one degree angle turns through $\frac{1}{360}$ of a full circle.

arc
Part of a circle's curve between any two of its points.

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Glossary

area
The measure, in square units, of the inside of a plane figure.

area model
A model of multiplication that shows each place value product.

array
An arrangement of objects in equal rows.

Associative Property of Addition
Changing the grouping of three or more addends does not change the sum.

Associative Property of Multiplication
Changing the grouping of three or more factors does not change the product.

attribute
A characteristic or property of an object, such as color, shape, size, and so on.

B

bar model
A model that uses bars to represent known and unknown quantities and the relationship between these quantities.

base
Any side of a plane figure. Usually thought of as a side where the figure "sits."

Base Ten numeral form
A common way of writing a number using digits. The value of a numeral depends on where it appears in the number (also known as standard form, such as 12,356).

Base Ten numerals
Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. The symbols can represent any amount based on a place value system of grouping by tens (also known as digits).

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benchmark
A known size or amount that can be used as a reference to help understand a different size or amount. A benchmark can be used to estimate measurement.

benchmark fractions
Fractions that are commonly used for estimation. A benchmark fraction helps you compare two fractions. One-half, one-third, one-fourth, three-fourths, and two-thirds are all benchmark fractions

C

capacity
The amount of liquid a container can hold.

centimeter (cm)
A metric unit of length equal to 0.01 $\left(\frac{1}{100}\right)$ of a meter.

circle
A plane figure with all points the same distance from a fixed point called a center.

classify
To sort into categories or to arrange into groups by attributes.

clockwise
The same direction in which the hands on a clock move.

common
Belonging to or shared by.

common denominator
For two or more fractions, a common denominator is a common multiple of the denominators. Three-fourths and two-fourths have four as a common denominator.

common factor
Any common factor of two or more numbers. Six is a common factor of both 12 and 24.

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common multiple
Any common multiple of two or more numbers. Six is a common multiple of both 2 and 3.

common numerator
For two or more fractions, a common numerator is a common multiple of the numerators.

Commutative Property of Addition
Changing the order of the addends does not change the sum.

Commutative Property of Multiplication
Changing the order of the factors does not change the product.

compare
To decide if one number is greater than, less than, or equal to.

compatible numbers
Numbers that are easy to compute mentally and are close in value to the actual numbers. Compatible numbers can be used when estimating.

compose
To put together smaller numbers to make larger numbers.

composite number
A number greater than 0 that has more than two different factors.

congruent
Having exactly the same size and shape.

counterclockwise
The opposite direction from the direction that the hands move on a clock.

cup (c)
A customary unit of capacity.
1 cup = about 236.5 milliliters.

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customary system
A system of measurement used in the United States. The system includes units for measuring length, capacity, and weight. Nearly everyone else uses the metric system.

D

data
A collection of information gathered for a purpose. Data may be in the form of either words or numbers.

day
The length of time it takes the Earth to make a complete rotation. 24 hours = 1 day.

decimal
A number with one or more digits to the right of a decimal point. In 7.46, forty-six hundredths is the decimal or fraction of the whole.

decimal fraction
A fractional number with a denominator of 10 or a power of 10. It can be written with a decimal point.

decimal notation
Uses digits 0–9 and a decimal point. For example: 23.56 is in decimal notation.

decimal point
A dot (.) separating the whole number from the fraction (parts) in decimal notation.

decimeter (dm)
A metric unit of length.
1 decimeter = 0.1 meter;
10 decimeters = 1 meter. A hand span is about 1 decimeter.

decompose
To separate a number into two or more parts.

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Glossary

degree (angle measure)
A unit for measuring angles. It is based on dividing one complete circle into 360 equal parts. A one degree angle = $\frac{1}{360}$ of a circle.

determine
To decide or settle upon, figure out.

denominator
The quantity below the line in a fraction. It tells how many equal parts are in the whole.

diagonal
A line that goes through vertices of a polygon that are not next to each other.

difference
The amount that remains after one quantity is subtracted from another. The answer in a subtraction problem.

display
To show, exhibit, or demonstrate.

digit
Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. (Also known as Base Ten numerals.)

Distributive Property
When one of the factors of a product is a sum, multiplying each addend before adding does not change the product.

divide
To separate into equal groups and find the number in each group or the number of groups. 56 split into 8 equal groups equals seven in each group $56 \div 8 = 7$

dividend
A number that is divided by another number. 56 is the dividend in the above example.

divisible
A number is divisible by another number if the quotient is a counting number without a remainder.

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divisor
The number by which another number is divided. 8 is the divisor in 56 ÷ 8 = 7.

E

elapsed time
The amount of time that has passed (also known as time interval). Six hours elapse between 8:00 am and 2:00 pm.

endpoint
A point at either end of a line segment, or a point at one end of a ray.

equal
Having the same value.
2 feet = 24 inches.

equation
A mathematical sentence with an equal sign. The amount on one side of the equal sign has the same value as the amount on the other side. 4 + 3 = 7

equivalent decimals
Decimals that have the same value. 0.7 = 0.70

equivalent fractions
Fractions that have the same value. $\frac{1}{2} = \frac{2}{4}$

estimate
To find a number close to an exact amount; an estimate tells *about* how much or *about* how many.

expanded form
A way to write numbers that shows the place value of each digit. 263 = 200 + 60 + 3

expression
A mathematical phrase without an equal sign. $n + 4$

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Glossary

F

fact family
A group of related facts that use the same numbers (also known as related facts). Fact family for 3, 5, 15: 3 × 5 = 15; 15 ÷ 5 = 3; 5 × 3 = 15; 15 ÷ 3 = 5

factors
The whole numbers that are multiplied to get a product. 6 × 7 = 42 (6 and 7 are factors.)

factor pairs
A set of two whole numbers that when multiplied will result in a given product. 2 × 3 = 6, 1 × 6 = 6. The factor pairs for 6 are: 2 and 3, 1 and 6.

fluid ounce (fl oz)
A customary unit of capacity. 1 fluid ounce = about 30 milliliters.

foot
A customary unit of length. 1 foot = about 30 centimeters.

formula
A rule that is written as an equation. $A = l \times w$

fraction
A way to describe a part of a whole or a part of a group by using equal parts.

fraction greater than one
A fraction with the numerator greater than the denominator. $\frac{6}{5}$

fraction less than one
A fraction with the numerator less than the denominator. $\frac{5}{6}$

G

gallon (gal)
A customary unit of capacity. 1 gallon = about 3.8 liters.

gram
The standard unit of mass in the metric system. 1,000 grams = 1 kilogram. The mass of a paperclip is about 1 gram.

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greater than >
Used to compare two numbers when the first number is larger than the second number.



H

half gallon
A customary unit of capacity.
1 half gallon = about 1.9 liters.

height
A perpendicular line segment from the base to the top of the figure.

hexagon
A polygon with six sides.

horizontal
Parallel to the horizon.
Horizontal lines go from left to right or right to left.

hour (hr)
A unit of time.
1 hour = 60 minutes;
24 hours = 1 day.

Hundreds
The value of a digit that is the third position from the right when describing whole number place value.

hundredth
One of the equal parts when a whole is divided into 100 equal parts.

Hundredths
In the decimal numeration system, Hundredths is the name of the next place to the right of Tenths.



I

identify
Recognize or distinguish, figure out what it is, name it.

Identity Property of Multiplication
The property that states that the product of any number and 1 is that number: $n \times 1 = n$

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inch
A customary unit of length.
1 inch = about 2.5 centimeters.

intersecting lines
Lines that cross at a point.

inverse operations
Operations that undo each other. Multiplication and division are inverse operations.
$8 \times 5 = 40$ and $40 \div 5 = 8$

interpret
To explain or tell the meaning of something.

J

justify
To show or prove to be right or reasonable.

K

kilogram (kg)
A metric unit of mass equal to 1,000 grams. 1 kilogram = about 2.2 pounds.

kilometer (km)
A metric unit of length equal to 1,000 meters.

L

length
How long something is. The distance from one point to another. Length is measured in units such as centimeters, meters, and kilometers. One dimension of a 2-dimensional or 3-dimensional figure.

less than <
Used to compare two numbers when the first number is smaller than the second number.

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like denominators
Denominators in two or more fractions that are the same.

like numerators
Numerators in two or more fractions that are the same.

line
A set of connected points continuing without end in both directions.

line of symmetry
A line that divides a figure into two congruent halves that are mirror images of each other.

line plot
A diagram showing frequency of data on a number line.

line segment
A part of a line with two endpoints.

line symmetric figures
Figures that can be folded in half and its two parts match exactly.

line symmetry
What a figure has if it can be folded in half and its two parts match exactly.

liter (L)
The basic unit of capacity in the metric system.
1 liter = 1,000 milliliters.

lowest terms
When a fraction is expressed with the fewest possible pieces, it is in lowest terms (also known as simplest form).

M

mass
The amount of matter in an object, usually measured by comparing with an object of known mass. While gravity influences weight, it does not affect mass.

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mental math or mental calculation
Calculations that are done in a student's head without pencil and paper, calculators, or other aids.

meter (m)
A standard unit of length in the metric system.

metric system
A system of measurement based on tens. The basic unit of capacity is the liter. The basic unit of length is the meter. The basic unit of mass is the gram.

mile (mi)
A customary unit of length.
1 mile = about 1.6 kilometers.

milliliter (mL)
A metric unit of capacity.
1,000 milliliters = 1 liter.
This holds about 10 drops or 1 milliliter.

millimeter
A metric unit of length.
1,000 millimeters = 1 meter.

minute (min)
A unit used to measure a short amount of time. There are 60 minutes in one hour.

mixed number
A number that has a whole number and a fraction.

model or visual model
A picture or representation of a solution, a number, or a concept.

month
A length of time equal to 28, 30, or 31 days. 12 months = 1 year.

multidigit
Having more than one digit (number). Seven (7) is a single digit, whereas seventy-two (72) or seven hundred forty-two (742) are multidigit numbers.

multiple
A product of a given whole number and any other whole number. 12 is a multiple of 3 and 4 because $3 \times 4 = 12$.

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multiplicative comparison
A way to compare quantities using multiplication, as in "This tree is 3 times shorter than that tree."

multiply
The operation of repeated addition of the same number.
$3 \times 5 = 5 + 5 + 5$



N

number
The quantity we associate with a numeral. Often used interchangeably with digit and numeral.

number line
A diagram that represents numbers as points on a line.

number names
A way of using words to write a number (also known as word form).

numeral
Represents the idea of a number. The numeral 153 is composed of digits 1, 5, and 3. Often used interchangeably with digit and number.

numerator
The number written above the line in a fraction. It tells how many equal parts are described in the fraction.



O

obtuse angle
An angle with a measure greater than 90° but less than 180°.

obtuse triangle
A triangle that contains one angle with a measure greater than 90° (obtuse angle) and two acute angles.

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Ones
The value of a digit that is farthest to the right when describing whole number place value.

order
A sequence or arrangement of things.

Order of Operations
A set of rules that tells the order in which to compute.
1. Do operations in parentheses.
2. Multiply and divide in order from left to right.
3. Add and subtract in order from left to right.

ounce (oz)
A customary unit of weight equal to $\frac{1}{16}$ of a pound.
1 ounce = about 28 grams.

P

p.m.
The time between 12:00 noon and 12:00 midnight.

parallel lines
Lines that are always the same distance apart. They do not intersect.

parallelogram
A quadrilateral with two pairs of parallel and congruent sides.

parentheses
Used in mathematics as grouping symbols for operations. When simplifying an expression, the operations within the parentheses are performed first.

partial product
A method of multiplying in which the value of each digit in a factor is multiplied separately, and then the partial products are added together.

partial quotient
A method of dividing in which multiples of the divisor are subtracted from the dividend, and then the partial quotients are added together.

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pattern
A repeating or growing sequence or design. An ordered set of numbers or shapes arranged according to a rule.

perimeter
The distance around the outside of a figure.

period
In a large number, periods are groups of 3 digits separated by commas or by spaces.

perpendicular lines
Two intersecting lines that form right angles.

pint (pt)
A customary unit of capacity.
1 pint = about 0.47 liters.

place value
The value of the place of a digit in a number.

plane figure
A two-dimensional figure.

point
The exact location in space, represented by a dot.

polygon
A closed two-dimensional shape with 3 or more sides.

pound (lb)
A customary unit of weight.
1 pound = about .45 kilograms.

prime number
A whole number greater than 1 that has exactly two different factors, 1 and itself.

product
The answer to a multiplication problem. In $6 \times 7 = 42$, 42 is the product, or answer.

protractor
A tool used to measure and draw angles.

Q

quadrilateral
A polygon with four sides.

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quart (qt)
A customary unit of capacity.
1 quart = about 1 liter.

quotient
The answer to a division problem.

R

range
The difference between the highest and lowest values.

ray
A part of a line that has one endpoint and goes on forever in one direction.

reasonableness
An answer that is based on good number sense.

rectangle
A quadrilateral with two pairs of congruent, parallel sides and four equal angles.

recognize
Identify (someone or something) from having encountered them before; know again, remember.

regroup
To rearrange numbers into groups of 10 when performing mathematical operations.

regular polygon
A polygon with all sides the same length and all angles the same measure.

related facts (fact family)
Related addition and subtraction facts or related multiplication and division facts.
Related facts for 3, 5, 8:
3 + 5 = 8; 8 – 5 = 3; 5 + 3 = 8;
8 – 3 = 5 (also known as fact family).

remainder
The amount left over when one number is divided by another.

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repeated subtraction
Subtracting equal groups to find the total amount of groups (also called division).

represent
To show or model.

rhombus
A quadrilateral with all four sides equal in length.

right angle
An angle that measures exactly 90°.

right triangle
A triangle that has one 90° angle.

round a whole number
To identify the nearest Ten, Hundred, Thousand, (and so on) and rename a number so it is easier to mentally add, subtract, multiply, or divide.

rule
Something that happens every time (for example: 2, 5, 8, 11 . . . the rule is +3).

S

second (sec)
A unit used to measure a very short amount of time. There are 60 seconds in one minute.

sequence
A set of numbers arranged in a special order or pattern.

simplest form
When a fraction is expressed with the fewest possible pieces, it is in simplest form (also known as lowest terms).

simplify
To express a fraction in simplest form.

sketch
A quick, rough drawing.

specify
Identify clearly and definitely.

square
A parallelogram with four equal angles and four equal sides.

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square unit
A unit, such as square centimeter, used to measure area.

standard form
A common or usual way of writing a number using digits. 12,376 is in standard form.

straight angle
An angle that measures exactly 180°.

subtract
An operation that gives the difference between two numbers. Subtraction can be used to compare two numbers, or to find out how much is left after some is taken away.

sum
The answer to an addition problem.

T

Tens
The value of a digit that is the second position from the right when describing whole number place value.

tenth
One of the equal parts when a whole is divided into 10 equal parts.

Tenths
In the decimal numeration, tenths is the name of the place to the right of the decimal point.

Thousands
The value of a digit that is the fourth position from the right when describing whole number place value.

time interval
A duration of a segment of time (also known as elapsed time).

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ton
A customary unit of weight.
1 ton (T) = 2,000 pounds.
A metric ton, or tonne (t) is a unit of mass equal to 1,000 kilograms (about 2,200 pounds).

trapezium
A quadrilateral with one pair of parallel sides and one pair of sides that are not parallel.

triangle
A polygon with three sides and three angles.

two-dimensional
Having length and width.



unit fraction
A fraction that has 1 as its numerator. A unit fraction names 1 equal part of a whole.

unlike denominators
Bottom numbers of a fraction that are not equal.

unlike numerators
Top numbers of a fraction that are not equal.



variable
A letter or symbol that represents a number. $5 \times b = 10$
b is a variable worth 2.

Venn diagram
A drawing with circles or rings to show how sets of objects are related.

vertex (plural: vertices)
The point at which two line segments, lines, or rays meet to form an angle.

vertical
Perpendicular to the horizon. Vertical lines go up and down.

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Glossary

volume
The number of cubic units it takes to fill a figure.

W

week
There are seven days in a week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.

weight
The measure of how heavy something is.

whole
All of an object, a group of objects, shape, or quantity.

whole numbers
The numbers 0, 1, 2, 3, and so on, without fractions or decimals.

width
One dimension of a 2-dimensional or 3-dimensional figure.

word form
A way of using words to write a number. The word form of 12,345 is twelve thousand, three hundred forty-five.

Y

yard (yd)
A customary unit of length. 1 yard = about 0.9 meters.

year
The length of time it takes the Earth to revolve around the sun. 12 months = 1 year; 365 days = 1 year; 366 days = 1 leap year.

Z

Zero Property of Multiplication
The product of any number and zero is zero. $8 \times 0 = 0$

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Primary 4

Math Term 1

Originally stood 146.5 meters

About 453,592,370 kg of mortar



Primary 4
Student Edition
Math Term 1











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